-	206	979	-178	-352	-36	372	585	-635	438	-130	-677	-164	41	-73	-335	-54	27	-12	-255	-97
-	-12	-10793	-6981	-732	-1329	-1694	-533	*	*											
42	688	-1698	-342	1095	-2713	881	-2092	212	-571	-947	-931	412	-624	-1377	1728	-2731	-2651	-723	-2932	689
-	206	979	-178	-352	-36	372	585	-635	438	-130	-677	-164	41	-73	-335	-54	27	-12	-255	-97
-	-28	-10853	-5760	-732	-1329	-2629	-254	*	*											
43	-1326	-1683	1777	1763	-1023	-3	-322	213	-524	-1506	-3339	-2827	-2020	5	-43	-364	490	-2675	1527	-254
-	206	979	-178	-352	-36	372	585	-635	438	-130	-677	-164	41	-73	-335	-54	27	-12	-255	-97
-	-37	-10835	-5337	-732	-1329	-2256	-339	*	*											
44	-1300	-1676	803	789	-73	1088	-1270	1314	685	-589	-222	-775	-2614	-2728	-1642	-1590	-2628	-378	-2910	1729
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-	-1	-10826	-11826	-732	-1329	-2267	-336	*	*											
45	-697	-1700	264	1845	-1349	715	807	-487	-2221	-1240	629	57	-2639	-64	-529	647	-1184	400	-2934	-2776
-	206	979	-178	-352	-36	372	585	-635	438	-130	-677	-164	41	-73	-335	-54	27	-12	-255	-97
-	-53	-10855	-4802	-732	-1329	-2945	-201	*	*											
46	-798	-1655	263	31	-99	1207	-938	-29	93	115	608	34	-816	-848	268	-1371	-1351	664	-2889	465
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-	-159	-10802	-3270	-732	-1329	-2492	-282	*	*											
47	199	-1541	1477	-805	-682	306	1307	-1314	-1353	-2124	-226	1355	3	-2593	369	-314	-2494	477	493	779
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-	-1	-10670	-11670	-732	-1329	-3084	-181	*	*											
48	-230	-1557	580	-1202	-715	1035	1992	-380	580	-1519	-3213	-1183	-720	-2002	-108	77	-270	-1336	-2791	2145
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49	-1565	-1557	368	869	-1170	584	2113	-645	-540	-1614	-3213	-866	-2496	-552	-262	-767	-1835	637	-2791	2575
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50	-456	-1542	107	-293	1366	737	2559	-39	-358	-1378	-407	989	-2480	-967	-379	-887	-2494	-62	-2776	665
-	206	979	-178	-352	-36	372	585	-635	438	-130	-677	-164	41	-73	-335	-54	27	-12	-255	-97
-	-57	-10670	-4711	-732	-1329	-3615	-123	*	*											
51	-558	-1494	142	-475	1601	-966	259	36	-2036	-1975	-468	117	-825	19	-807	-1047	860	310	-2728	2407
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-	-72	-10615	-4381	-732	-1329	-2573	-265	*	*											
52	-21	-1484	-1819	214	521	-825	4	-308	-1101	-618	-2065	935	889	-81	535	1035	-805	182	-2718	-439
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-	-36	-10602	-5378	-732	-1329	-3228	-163	*	*											
53	-1140	-1473	-1114	710	1830	-468	-1867	-619	1139	-2278	1045	543	-2412	-1567	38	777	-935	-762	-2707	882
-	206	979	-178	-352	-36	372	585	-635	438	-130	-677	-164	41	-73	-335	-54	27	-12	-255	-97
-	-105	-10589	-3848	-732	-1329	-2149	-368	*	*											
54	-1856	-1470	-1180	977	-952	-983	1880	-49	-1551	381	-3126	589	1026	76	428	-881	-1009	401	-2704	666
-	206	979	-178	-352	-36	372	585	-635	438	-130	-677	-164	41	-73	-335	-54	27	-12	-255	-97
-	-54	-10586	-4795	-732	-1329	-2130	-374	*	*											
55	123	-1510	-477	847	-813	-589	-1163	-1424	-280	-1445	-153	-243	997	-146	83	746	1031	-1356	-2744	950
-	206	979	-178	-352	-36	372	585	-635	438	-130	-677	-164	41	-73	-335	-54	27	-12	-255	-97
-	-88	-10633	-4091	-732	-1329	-2118	-378	*	*											
56	-577	-1512	-722	1002	-2528	-441	159	9	942	-629	-191	-475	-1542	-937	38	499	1	662	-2746	933
-	206	979	-178	-352	-36	372	585	-635	438	-130	-677	-164	41	-73	-335	-54	27	-12	-255	-97

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57	-1369	-1531	620	712	629	-441	579	-52	1188	-1476	1397	-255	-710	1199	-1180	-442	-525	-2428	1445	-409	
-	206	979	-178	-352	-36	372	585	-635	438	-130	-677	-164	41	-73	-335	-54	27	-12	-255	-97	
-	-8	-10658	-7651	-732	-1329	-2350	-315	*	*												
58	-1746	-80	541	1438	-441	-992	774	-608	471	11	144	1008	796	-73	-358	-1130	-992	-2568	-2811	333	
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59	-830	-1493	-403	138	1111	877	1368	-660	1066	-1549	1013	-1659	-2432	69	-808	-1059	282	515	1336	-2569	
-	206	979	-178	-352	-36	372	585	-635	438	-130	-677	-164	41	-73	-335	-54	27	-12	-255	-97	
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60	-940	-1448	653	904	1041	-2055	1066	841	307	50	-140	455	-2387	-467	-725	-103	392	-2440	-2682	-500	
-	206	979	-178	-352	-36	372	585	-635	438	-130	-677	-164	41	-73	-335	-54	27	-12	-255	-97	
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62	-1574	-1509	-79	268	-96	-614	-57	223	372	-121	-986	-798	-2447	839	79	1260	51	-310	-1202	466	
-	206	979	-178	-352	-36	372	585	-635	438	-130	-677	-164	41	-73	-335	-54	27	-12	-255	-97	
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63	1038	-684	-325	972	-2534	1412	-604	280	-413	-102	-83	-430	-2457	-659	-14	-526	-1032	-1066	-2753	-1667	
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65	-1088	-1616	914	-989	610	-20	1292	-469	301	-912	-300	107	-2555	1147	-13	-165	-2569	1227	-46	-494	
-	206	979	-178	-352	-36	372	585	-635	438	-130	-677	-164	41	-73	-335	-54	27	-12	-255	-97	
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66	214	-1541	-265	-52	695	-159	269	-1685	863	-309	-3197	280	-2480	382	-1010	1180	-181	-997	-2775	715	
-	206	979	-178	-352	-36	372	585	-635	438	-130	-677	-164	41	-73	-335	-54	27	-12	-255	-97	
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67	-118	-17	-952	698	931	1491	-286	193	-600	-788	-3197	319	-2442	838	-857	-470	384	-1259	-2775	-1478	
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68	-198	-1541	121	370	-93	368	758	-876	69	104	42	122	-2480	-2593	-685	259	785	405	-2775	153	
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69	782	-1525	-2683	1133	-61	-1336	-164	-1106	-894	1136	-1707	399	-2464	-504	-644	503	-428	144	-2759	-1570	
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72	675	596	-756	-312	-1447	414	-1084	366	-2183	-452	-3298	482	-2581	171	-350	126	983	-47	-1066	1291
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73	-21	-1568	819	-368	-209	1503	-2007	-1326	-855	-1323	-2199	1031	-2552	-694	-375	559	-1162	445	-2847	805
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74	247	-1613	-776	-29	-453	485	1018	249	140	-1045	-255	909	-2552	-488	173	445	788	-404	-2847	-1265
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75	-1188	486	-860	-998	-584	-557	2072	366	-321	200	-3229	640	-2512	691	-2887	60	-54	366	-2807	1850
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76	-255	-1555	-1782	930	-1036	-304	2721	-444	58	-154	-3210	1071	-2493	1186	-2869	-329	-2507	-94	-2789	596
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77	-1362	286	-834	-1256	-802	1213	801	-649	-1117	-777	-3273	417	-645	-1099	808	1080	-363	360	-2851	1081
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78	-1140	383	-286	-220	-1989	638	-1757	804	-331	798	-3274	1354	-2556	192	-178	-1484	69	-2609	-2852	1585
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79	-126	1300	-1019	-2897	-85	485	-785	-880	-895	353	-567	448	-2546	1487	-348	292	200	-499	-1192	1307
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80	-943	-1568	-1164	-420	667	516	-1962	210	92	-449	-3223	71	-2506	-2620	-2882	1193	735	838	-2802	1046
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81	-512	-1540	-1048	-749	-529	1277	-1934	-3154	-86	-1366	1325	-856	-2478	-273	-283	-29	1198	1369	-2774	230
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82	166	-1532	305	-348	-2548	-1253	-1927	206	-854	-1134	-3188	-823	-1740	936	873	1192	527	1119	-2766	-2608
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83	49	409	-2639	-444	-2497	-1066	-277	381	-240	625	-352	-601	57	457	810	534	-681	924	-2715	-2557
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84	-12	-1493	-112	-1572	-386	-1009	50	661	502	-591	-3149	1529	-1450	944	356	411	-1915	755	-2728	-2569
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85	-881	-1506	-669	242	-1352	-1186	-1900	1597	311	-758	-326	-482	334	-1743	1098	-739	1145	196	-2740	-2063
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86	651	-1506	689	992	-506	-2113	136	465	368	-1468	-3161	-625	39	847	201	-428	-843	589	-2740	-2582
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87	58	329	-2679	1195	-1446	312	820	267	195	288	-3177	-917	-783	-137	-567	-114	-403	785	-2755	-2597

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88	642	238	579	-214	517	-2129	-1004	281	74	-1358	-3177	-970	-819	2236	483	-2555	-2474	988	-2755	-2597				
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89	967	-1521	-231	608	-2433	-1566	194	96	-304	383	-93	776	463	404	777	-2481	-884	-198	-2755	-2597				
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91	328	-1390	-188	-806	-282	-1036	1674	740	-304	-285	1415	428	-593	1184	451	-983	-2396	356	-2678	-2519				
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92	733	-1416	656	-1158	-2431	4	-254	566	617	995	-3072	-954	-2355	387	-1365	-2130	363	503	-2650	-2492				
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93	-448	1600	810	-1630	-2494	-125	181	-342	558	843	-3134	430	-2417	898	18	153	-1719	-217	-2713	-187				
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94	-984	-1479	338	-2810	-317	600	438	988	-466	456	-2998	-74	-789	1353	-96	-1310	-171	817	-2713	-2555				
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-	206	979	-178	-352	-36	372	585	-635	438	-130	-677	-164	41	-73	-335	-54	27	-12	-255	-97
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127	-1237	1243	-1544	425	-2378	-126	-265	-422	882	-76	445	-74	-2301	657	1269	-752	268	575	-2597	-1637
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131	-2012	-1339	-990	901	-2354	-345	1793	-992	872	631	226	730	-488	633	899	-694	-324	-2330	-2573	-2415
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-	206	979	-178	-352	-36	372	585	-635	438	-130	-677	-164	41	-73	-335	-54	27	-12	-255	-97
-	-2	-10448	-10798	-732	-1329	-4043	-90	*	*											
146	494	-1355	1498	-811	135	-868	-1749	875	691	149	-2559	-1834	71	903	128	-844	-1844	-1203	-2589	-616
-	206	979	-178	-352	-36	372	585	-635	438	-130	-677	-164	41	-73	-335	-54	27	-12	-255	-97
-	-48	-10447	-4957	-732	-1329	-4008	-93	*	*											
147	755	908	194	751	-509	-935	-568	-230	984	-383	977	-2459	-477	-329	340	-1063	602	-2307	-2550	-23
-	206	979	-178	-352	-36	372	585	-635	438	-130	-677	-164	41	-73	-335	-54	27	-12	-255	-97
-	-2	-10401	-11401	-732	-1329	-4123	-85	*	*											
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-	-2	-10401	-11401	-732	-1329	-4123	-85	*	*																
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150	200	1776	-205	1241	419	-745	-14	-1143	414	490	-2972	-589	-2255	514	-2348	282	-610	-1843	-2550	613					
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154	-992	1273	-236	715	550	-1327	-914	533	134	-24	-1211	-136	441	812	-2630	-337	44	387	-2550	7					
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155	141	1204	1220	-247	285	-793	-1710	517	-1857	-1024	845	330	26	379	-785	-77	480	-809	217	-178					
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-	-2	-10401	-11401	-732	-1329	-4123	-85	*	*																
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-	-2	-10360	-11360	-732	-1329	-4197	-81	*	*																
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161	52	-1282	758	580	21	-893	-1676	712	-1824	437	-2938	1093	-2221	39	-699	-22	781	-491	-2516	-2358					
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164	22	-1244	796	693	-2259	-826	-1638	659	-1786	-296	-2900	1587	-269	274	-2558	-987	-890	764	-2478	1037
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-	-56	-10313	-4750	-732	-1329	-4265	-77	*	*											
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-	206	979	-178	-352	-36	372	585	-635	438	-130	-677	-164	41	-73	-335	-54	27	-12	-255	-97
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-	-32	-10258	-5580	-732	-1329	-4337	-73	*	*											
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-	206	979	-178	-352	-36	372	585	-635	438	-130	-677	-164	41	-73	-335	-54	27	-12	-255	-97
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168	621	891	-28	775	-1467	-334	529	524	-432	338	-435	384	-455	331	-1552	-422	-2098	-303	906	-554
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-	-179	-10176	-3112	-732	-1329	-4099	-87	*	*											
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-	-135	-9961	-3504	-732	-1329	-4654	-58	*	*											
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187	-796	-23	-1181	-1354	-1038	-630	374	449	-564	-1132	-363	-1166	1637	880	286	346	-975	804	2232	-1099
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-	-256	-8577	-2646	-732	-1329	-5290	-37	*	*											
188	-657	116	-1042	-1215	-899	-491	-278	108	267	212	-1540	-1027	-442	-936	-1137	-745	-836	1316	3885	-960
-	206	979	-178	-352	-36	372	585	-635	438	-130	-677	-164	41	-73	-335	-54	27	-12	-255	-97
-	-383	-8318	-2119	-732	-1329	-5336	-36	*	*											
189	-277	303	-854	178	-712	-304	-91	-1245	-238	-459	1002	-840	-635	-749	-1011	-708	-451	1539	3302	-773
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190	-316	458	-700	-874	-558	-150	63	-1157	769	-652	-1198	-686	1731	-595	-857	-576	-495	1424	-776	-618
-	206	979	-178	-352	-36	372	585	-635	438	-130	-677	-164	41	-73	-335	-54	27	-12	-255	-97
-	-383	-7576	-2132	-732	-1329	-5431	-34	*	*											
191	195	597	-560	-734	-418	-10	203	-1017	56	304	-1059	-546	1078	1508	-329	-353	-355	-394	-637	-479
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192	24	797	-361	-268	-218	190	403	-768	1597	-313	-859	-347	-142	-255	-517	-236	-156	-195	-437	-279
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-	-939	-5028	-1159	-714	-1357	-5509	-32	*	*											
193	192	965	-192	-366	-50	358	571	-649	424	12	-691	-178	27	-87	-349	-68	13	-26	-269	-111
-	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*
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//

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HMMER2.0
NAME hyd-phobc.txt
DESC
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ALPH  Amino
RF    no
CS    no
COM   [converted from an old Plan9 HMM]
NSEQ  0
DATE  Mon Mar  8 11:45:19 1999
XT      -8455     -4  -1000  -1000  -8455     -4  -8455     -4
NULT       -4  -8455
NULE      595  -1558     85    338   -294    453  -1158    197    249    902  -1085   -142    -21   -313     45    531    201    384  -1998   -644
HMM         A      C      D      E      F      G      H      I      K      L      M      N      P      Q      R      S      T      V      W      Y

        m->m   m->i   m->d   i->m   i->i   d->m   d->d   b->m   m->e
       -3892      *   -101
    1    796    224   -933  -1107   -791    345   -170  -1390    370   -229  -1432    404   1515   -828  -1090    -39   -728   -767   1428    633
    -    206    979   -178   -352    -36    372    585   -635    438   -130   -677   -164     41    -73   -335    -54     27    -12   -255    -97
    -     -9  -7945  -8245   -732  -1329  -3457   -138  -3892      *
    2    256    153  -1005   -458    443    771   -242  -1462   -389   -957  -1503   -991    148   -900  -1162    685   1250   -543  -1081   1305
    -    206    979   -178   -352    -36    372    585   -635    438   -130   -677   -164     41    -73   -335    -54     27    -12   -255    -97
    -     -8  -8030  -9030   -732  -1329  -4178    -82      *      *
    3   -410    140  -1018  -1192    364    292   -254  -1475    870   -345  -1516  -1004   1542    520    110   -122    337   -852  -1094    465
    -    206    979   -178   -352    -36    372    585   -635    438   -130   -677   -164     41    -73   -335    -54     27    -12   -255    -97
    -     -8  -8055  -9055   -732  -1329  -4382    -71      *      *
    4    709    140  -1018   -753    472   -467   1129  -1475    452   -215    151  -1004    353   -912  -1174    673     66   -852    954   1023
    -    206    979   -178   -352    -36    372    585   -635    438   -130   -677   -164     41    -73   -335    -54     27    -12   -255    -97
    -     -8  -8055  -9055   -732  -1329  -3948    -97      *      *
    5    765    112  -1045  -1219    259   1067   1221  -1502   -429   -288  -1544  -1031    371    -63  -1202   -185    763    -62    687   -964
    -    206    979   -178   -352    -36    372    585   -635    438   -130   -677   -164     41    -73   -335    -54     27    -12   -255    -97
    -     -8  -8108  -9108   -732  -1329  -3090   -180      *      *
    6   -296     47  -1111   -579    345    129   -347  -1568   -495    457   -540  -1097   1661    489  -1267   -254    832   -945  -1187    544
    -    206    979   -178   -352    -36    372    585   -635    438   -130   -677   -164     41    -73   -335    -54     27    -12   -255    -97
    -     -7  -8187  -9187   -732  -1329  -2241   -343      *      *
    7    238    -56  -1213  -1387    826    500    136  -1670   -597    133  -1711  -1199   1534    904  -1370     10   -408   -282  -1290    766
    -    206    979   -178   -352    -36    372    585   -635    438   -130   -677   -164     41    -73   -335    -54     27    -12   -255    -97
    -     -7  -8317  -9317   -732  -1329  -3132   -175      *      *
    8    544    -66   -200   -836    267    422    995  -1100   -149    145  -1722  -1209    724     61   -156    444   -434     22  -1300  -1142
    -    206    979   -178   -352    -36    372    585   -635    438   -130   -677   -164     41    -73   -335    -54     27    -12   -255    -97
    -     -7  -8325  -9325   -732  -1329  -2827   -219      *      *
    9   1033   -106    -12   -994     26     79   -500  -1721     29     20  -1080   -279    163    105  -1420   1004   -289  -1098    485    202
    -    206    979   -178   -352    -36    372    585   -635    438   -130   -677   -164     41    -73   -335    -54     27    -12   -255    -97
    -     -6  -8405  -9405   -732  -1329  -3551   -129      *      *
   10   -543   -106  -1264  -1437   1159    780    473  -1721   -409  -1072  -1762  -1250   1684    759   -295    -32     42    -45    216    270
    -    206    979   -178   -352    -36    372    585   -635    438   -130   -677   -164     41    -73   -335    -54     27    -12   -255    -97
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-	-6	-8405	-9405	-732	-1329	-3551	-129	*	*										
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-	-6	-8408	-9408	-732	-1329	-2953	-199	*	*										
13	1229	-115	-1028	-1447	17	65	1100	-1730	130	-579	-1771	122	618	4	-510	281	302	-528	-1349	132
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-	-6	-8412	-9412	-732	-1329	-3380	-146	*	*										
14	51	-115	-1273	-1447	257	464	-509	-1175	376	348	-1771	7	666	692	-1429	753	595	-765	-1349	-1191
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-	-6	-8412	-9412	-732	-1329	-3380	-146	*	*										
15	-670	-115	-1273	-1214	154	709	776	-1139	383	-415	-1771	-1259	383	-1167	-1152	1277	582	181	314	192
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-	-6	-8448	-9448	-732	-1329	-3155	-172	*	*										
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21	-103	1421	-1293	-1467	820	-315	-530	-1283	167	-634	-1791	-485	381	284	-1450	892	801	-56	-1370	1202
-	206	979	-178	-352	-36	372	585	-635	438	-130	-677	-164	41	-73	-335	-54	27	-12	-255	-97
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22	261	-135	-1293	-1467	-328	84	-530	-1451	612	-599	-1791	-1279	731	-442	-1450	419	-11	1460	1263	191
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23	-486	-135	-1293	-1467	295	-157	403	-896	24	-492	-1791	-847	2007	158	-1450	138	882	-135	-1370	454
-	206	979	-178	-352	-36	372	585	-635	438	-130	-677	-164	41	-73	-335	-54	27	-12	-255	-97
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24	-909	-135	-1293	-1239	-1151	-106	-530	-1750	-677	85	625	412	589	-517	-793	1616	-893	-121	1119	1264
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25	-573	1406	-996	-789	-1151	175	1001	-857	329	-248	-1791	64	218	1570	-1450	-23	727	-194	-1370	230
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26	-907	1153	-846	-155	-327	571	384	-1748	1383	-1243	780	600	-20	-1185	-1447	-59	1034	-1125	-1367	482
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28	-940	1284	-300	-1498	657	-774	-52	-1781	-35	116	-1822	65	876	-375	-769	-260	276	-1158	-1401	2511
-	206	979	-178	-352	-36	372	585	-635	438	-130	-677	-164	41	-73	-335	-54	27	-12	-255	-97
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29	-166	1207	-1324	-1498	159	629	459	-1781	141	-374	-1822	558	995	1161	-1142	602	-1119	-795	-1401	644
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31	-42	-166	-388	-674	722	94	-561	-1781	-429	312	263	1178	13	157	-61	475	-383	-819	-1401	251
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32	190	1956	-893	-1498	749	-446	34	-1781	829	592	-1822	57	-436	-649	-1481	-927	-632	-33	-1401	1836
-	206	979	-178	-352	-36	372	585	-635	438	-130	-677	-164	41	-73	-335	-54	27	-12	-255	-97
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35	-214	2202	-1381	-1115	512	-452	746	-1838	-47	374	-213	-925	-77	-333	749	326	295	-662	-1457	655
-	206	979	-178	-352	-36	372	585	-635	438	-130	-677	-164	41	-73	-335	-54	27	-12	-255	-97
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36	-311	2007	-992	-868	-108	28	1013	-650	67	690	597	-1367	-137	512	-1537	175	-351	116	-1457	7
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37	-394	1506	-921	-1555	640	887	-617	-1838	-34	-263	-1879	-1367	792	779	-641	564	620	-27	-1457	-1299
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38	1004	2135	-1381	-1555	1697	140	-617	-1838	-122	359	-1879	-1367	-259	576	-1537	-1257	379	-272	-1457	-1299
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39	166	1147	-1381	-1555	-423	-830	-617	-1529	711	1113	-1879	78	108	1287	-1537	-535	337	-1031	1225	-292
-	206	979	-178	-352	-36	372	585	-635	438	-130	-677	-164	41	-73	-335	-54	27	-12	-255	-97
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45	-502	1983	-1311	-283	-1168	-760	-547	-1768	1501	161	-1809	-634	-89	1109	-1467	205	-73	226	-1387	176
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-	-78	-8478	-4319	-732	-1329	-2699	-241	*	*											
46	-264	-131	-1289	-1463	-1146	-738	-525	-1746	58	415	-1787	-1275	-475	603	-1445	1749	615	-34	1973	-1207
-	206	979	-178	-352	-36	372	585	-635	438	-130	-677	-164	41	-73	-335	-54	27	-12	-255	-97
-	-85	-8431	-4196	-732	-1329	-2786	-226	*	*											
47	406	-111	-1269	-990	-297	-718	-505	-1726	44	252	-1767	-1255	-586	37	-1425	16	-121	1642	1487	1045
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50	-97	1704	-74	-1489	-1173	-349	-552	-1772	87	173	-1813	126	-119	-519	-1472	267	1686	-315	540	253
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51	-463	1118	-464	-1458	912	-733	-520	-1741	20	249	-325	-1270	1128	-1178	-1440	266	297	-297	-1360	1994
-	206	979	-178	-352	-36	372	585	-635	438	-130	-677	-164	41	-73	-335	-54	27	-12	-255	-97
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-	206	979	-178	-352	-36	372	585	-635	438	-130	-677	-164	41	-73	-335	-54	27	-12	-255	-97
-	-7	-8205	-9205	-732	-1329	-3696	-116	*	*											
56	-203	2112	-1181	-1354	-1038	-630	-417	-1637	1186	-182	1182	1636	-405	-1075	-1337	-1056	-81	504	1184	-1099
-	206	979	-178	-352	-36	372	585	-635	438	-130	-677	-164	41	-73	-335	-54	27	-12	-255	-97

-	-7	-8205	-9205	-732	-1329	-3696	-116	*	*															
57	-143	-23	-1181	-1354	695	-630	-417	-1637	1796	-421	-1679	-1166	-962	1183	-1337	533	623	47	-1257	-1099				
-	206	979	-178	-352	-36	372	585	-635	438	-130	-677	-164	41	-73	-335	-54	27	-12	-255	-97				
-	-7	-8205	-9205	-732	-1329	-3696	-116	*	*															
58	-796	2846	-187	-1354	-382	-630	-417	-1637	427	1166	494	-1166	-962	-188	-1337	137	412	-834	-1257	-61				
-	206	979	-178	-352	-36	372	585	-635	438	-130	-677	-164	41	-73	-335	-54	27	-12	-255	-97				
-	-211	-8205	-2913	-732	-1329	-3696	-116	*	*															
59	482	1662	-1072	-1246	1741	-521	-308	-1529	-456	-328	-1570	-1058	926	879	-1228	-184	18	-344	867	78				
-	206	979	-178	-352	-36	372	585	-635	438	-130	-677	-164	41	-73	-335	-54	27	-12	-255	-97				
-	-9	-7972	-8972	-732	-1329	-3825	-106	*	*															
60	-688	3161	-1072	-1246	-659	-521	-308	-1529	779	265	-1570	-1058	35	-282	-418	-947	368	859	-314	-13				
-	206	979	-178	-352	-36	372	585	-635	438	-130	-677	-164	41	-73	-335	-54	27	-12	-255	-97				
-	-88	-7972	-4185	-732	-1329	-3825	-106	*	*															
61	461	1019	-1033	-1207	-891	-483	-270	-919	-417	-636	88	-1019	171	2454	-929	-909	933	-55	-1110	-951				
-	206	979	-178	-352	-36	372	585	-635	438	-130	-677	-164	41	-73	-335	-54	27	-12	-255	-97				
-	-9	-7883	-8883	-732	-1329	-3876	-102	*	*															
62	46	2054	-1033	-1207	-891	-483	-270	-448	755	1400	-1531	-1019	-814	592	-1190	-52	-528	-502	-1110	-951				
-	206	979	-178	-352	-36	372	585	-635	438	-130	-677	-164	41	-73	-335	-54	27	-12	-255	-97				
-	-9	-7883	-8883	-732	-1329	-3876	-102	*	*															
63	1236	125	-1033	-1207	-891	-50	-270	-311	-49	-617	-1531	-1019	828	-355	-1190	-480	1097	-697	2591	-951				
-	206	979	-178	-352	-36	372	585	-635	438	-130	-677	-164	41	-73	-335	-54	27	-12	-255	-97				
-	-10	-7775	-8775	-732	-1329	-3960	-96	*	*															
64	-195	2183	-989	-1163	-846	-438	-225	-998	1707	-657	-1487	-975	-770	-883	-1145	-864	160	1473	681	-907				
-	206	979	-178	-352	-36	372	585	-635	438	-130	-677	-164	41	-73	-335	-54	27	-12	-255	-97				
-	-106	-7883	-3915	-732	-1329	-3876	-102	*	*															
65	-605	1556	-989	-1163	-846	-235	-225	-1446	66	-488	-1487	746	893	901	-1145	-273	1536	-94	404	-907				
-	206	979	-178	-352	-36	372	585	-635	438	-130	-677	-164	41	-73	-335	-54	27	-12	-255	-97				
-	-42	-7775	-5378	-732	-1329	-3960	-96	*	*															
66	-101	3140	-363	-1149	-833	-425	-212	-1432	-359	143	-1473	-961	292	-870	-1132	508	-195	1020	-1052	-894				
-	206	979	-178	-352	-36	372	585	-635	438	-130	-677	-164	41	-73	-335	-54	27	-12	-255	-97				
-	-69	-7738	-4564	-732	-1329	-3996	-93	*	*															
67	-565	1100	-949	-1123	-807	-399	-186	-1406	-333	-690	-1447	-935	1798	-844	-838	-239	936	95	2283	1279				
-	206	979	-178	-352	-36	372	585	-635	438	-130	-677	-164	41	-73	-335	-54	27	-12	-255	-97				
-	-280	-7670	-2545	-732	-1329	-4034	-91	*	*															
68	-440	333	-825	-998	-682	-274	-61	-778	-208	514	-1323	-810	24	1	-199	-372	-129	1847	-901	-743				
-	206	979	-178	-352	-36	372	585	-635	438	-130	-677	-164	41	-73	-335	-54	27	-12	-255	-97				
-	-103	-7341	-3997	-732	-1329	-4148	-84	*	*															
69	-410	364	448	-564	159	-243	-30	-431	-178	-182	-1292	-780	-575	1998	903	-178	-360	-628	-870	-712				
-	206	979	-178	-352	-36	372	585	-635	438	-130	-677	-164	41	-73	-335	-54	27	-12	-255	-97				
-	-33	-7251	-5973	-732	-1329	-4251	-78	*	*															
70	-403	370	-788	-961	-645	-237	-24	869	287	1016	-655	-774	-569	118	-944	561	-583	79	-864	-706				
-	206	979	-178	-352	-36	372	585	-635	438	-130	-677	-164	41	-73	-335	-54	27	-12	-255	-97				
-	-86	-7235	-4279	-732	-1329	-4274	-77	*	*															
71	-379	394	-764	-937	-621	-213	0	-392	-7	-583	-1262	-749	-544	-658	-70	700	823	115	3347	-682				
-	206	979	-178	-352	-36	372	585	-635	438	-130	-677	-164	41	-73	-335	-54	27	-12	-255	-97				
-	-210	-7154	-2960	-732	-1329	-4319	-74	*	*															

72	-314	459	-699	-872	-556	-148	65	-1155	378	-503	-1197	-684	-480	-593	-855	942	-494	1818	-775	-617				
-	206	979	-178	-352	-36	372	585	-635	438	-130	-677	-164	41	-73	-335	-54	27	-12	-255	-97				
-	-402	-6982	-2089	-732	-1329	-4478	-66	*	*															
73	-180	593	1278	-305	-422	-14	199	-1021	52	-516	-1063	-36	-345	-459	-444	879	-160	146	-641	-483				
-	206	979	-178	-352	-36	372	585	-635	438	-130	-677	-164	41	-73	-335	-54	27	-12	-255	-97				
-	-212	-6474	-2998	-732	-1329	-4535	-64	*	*															
74	381	644	-514	-688	-372	36	249	-971	102	-466	-1012	-500	-295	-408	-670	1646	-97	-348	-590	-432				
-	206	979	-178	-352	-36	372	585	-635	438	-130	-677	-164	41	-73	-335	-54	27	-12	-255	-97				
-	-170	-6305	-3348	-732	-1329	-4604	-61	*	*															
75	-76	697	-460	-634	-318	90	303	-917	156	-412	-958	-446	-241	-355	-617	-336	1973	-294	-537	-378				
-	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*				
-	*	*	*	*	*	*	*	*	*															

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HMMER2.0
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DESC
LENG  23
ALPH  Amino
RF    no
CS    no
COM   [converted from an old Plan9 HMM]
NSEQ  0
DATE  Mon Mar  8 11:45:33 1999
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NULT       -4  -8455
NULE      595  -1558     85    338   -294    453  -1158    197    249    902  -1085   -142    -21   -313     45    531    201    384  -1998   -644
HMM         A      C      D      E      F      G      H      I      K      L      M      N      P      Q      R      S      T      V      W      Y

          m->m   m->i   m->d   i->m   i->i   d->m   d->d   b->m   m->e
          -270      *  -2550
    1    -1764   3160  -1674  -1340   1700  -1682   1673  -1725   -295  -1758  -2350   -600  -2309   -637  -1338    480   -794  -2035  -2704   2803
    -      206    979   -178   -352    -36    372    585   -635    438   -130   -677   -164     41    -73   -335    -54     27    -12   -255    -97
    -      -77 -15613  -4261   -732  -1329  -2287   -331   -270      *
    2     -957   2346  -1301   1115    -22   -323    636  -1168   1212   -252  -1982   -382  -1185    610   -420    208     64  -1221  -2252  -1904
    -      206    979   -178   -352    -36    372    585   -635    438   -130   -677   -164     41    -73   -335    -54     27    -12   -255    -97
    -       -2 -15573  -9567   -732  -1329  -1934   -438      *      *
    3    -2152   4599  -1636    156   -414  -1723    375   -788    352   -901  -1800  -1268  -4147   -151  -1003    -39   -838  -1358  -1118   -625
    -      206    979   -178   -352    -36    372    585   -635    438   -130   -677   -164     41    -73   -335    -54     27    -12   -255    -97
    -       -7 -15622  -7638   -732  -1329  -5068    -44      *      *
    4     -720   2689   -528    626  -2137    188    851  -1097    754  -1482  -1778    571  -1203    217   -357   1008    -79  -1286  -2273  -1606
    -      206    979   -178   -352    -36    372    585   -635    438   -130   -677   -164     41    -73   -335    -54     27    -12   -255    -97
    -       -6 -15617  -7828   -732  -1329  -5215    -39      *      *
    5    -1677   2191   -336   1680    265    328   2152  -1198    735   -654  -2292  -1365  -4319    384   -175   -743  -1323  -1243  -2307   -896
    -      206    979   -178   -352    -36    372    585   -635    438   -130   -677   -164     41    -73   -335    -54     27    -12   -255    -97
    -      -16 -15614  -6520   -732  -1329  -5591    -30      *      *
    6    -1507   4373  -2740  -2041   -869    -59   1732   -942    935   -840  -2151  -1428  -3558    419   -389    -82  -1097  -2118  -2409  -1925
    -      206    979   -178   -352    -36    372    585   -635    438   -130   -677   -164     41    -73   -335    -54     27    -12   -255    -97
    -      -17 -15598  -6415   -732  -1329  -6404    -17      *      *
    7     -710    103   -725   -770    737   2061   1259   -878    424  -1020  -1258  -1524  -2666    231    689   -326   -761  -1093  -1783  -1335
    -      206    979   -178   -352    -36    372    585   -635    438   -130   -677   -164     41    -73   -335    -54     27    -12   -255    -97
    -      -26 -15581  -5811   -732  -1329  -6487    -16      *      *
    8    -1181   1024  -3207  -2139   1300  -2173   1740   -178   2484   -947  -1441   -905  -3204   -982    672   -193   -565  -1120  -2572  -1074
    -      206    979   -178   -352    -36    372    585   -635    438   -130   -677   -164     41    -73   -335    -54     27    -12   -255    -97
    -      -30 -15554  -5582   -732  -1329  -5831    -26      *      *
    9      836   1020  -1939  -2169    781   -473   2628   -516   -829  -1045  -1594  -1030  -2509    355    256   1021    334   -670  -1662  -1614
    -      206    979   -178   -352    -36    372    585   -635    438   -130   -677   -164     41    -73   -335    -54     27    -12   -255    -97
    -     -117 -15524  -3683   -732  -1329  -7321     -9      *      *
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10	-1118	-1425	-2180	-2264	3123	-2298	2289	-1502	126	-1688	-2434	-577	-2694	508	569	127	-748	-1448	-865	-583
-	206	979	-178	-352	-36	372	585	-635	438	-130	-677	-164	41	-73	-335	-54	27	-12	-255	-97
-	-82	-15392	-4171	-732	-1329	-7375	-9	*	*											
11	-695	-163	-2078	-1979	-1287	-1006	1817	119	322	-352	-475	178	-2307	-38	1141	1526	495	-1299	-814	-971
-	206	979	-178	-352	-36	372	585	-635	438	-130	-677	-164	41	-73	-335	-54	27	-12	-255	-97
-	-22	-15295	-6030	-732	-1329	-7964	-6	*	*											
12	-1656	-67	-1100	-1479	-581	-2012	2592	-287	-178	-772	-1174	-331	-2630	1920	835	884	246	-1400	555	154
-	206	979	-178	-352	-36	372	585	-635	438	-130	-677	-164	41	-73	-335	-54	27	-12	-255	-97
-	-89	-15269	-4065	-732	-1329	-7645	-7	*	*											
13	-1399	-767	-1983	-1992	-914	-1572	2297	-707	803	313	-1702	535	-1477	330	1033	1444	-584	-1581	-1992	-1014
-	206	979	-178	-352	-36	372	585	-635	438	-130	-677	-164	41	-73	-335	-54	27	-12	-255	-97
-	-98	-15160	-3931	-732	-1329	-8190	-5	*	*											
14	-1156	-1977	-1189	-1433	-1088	-1671	2555	-470	-777	573	-963	-306	-2358	-230	-95	1940	157	-1239	-2464	-1047
-	206	979	-178	-352	-36	372	585	-635	438	-130	-677	-164	41	-73	-335	-54	27	-12	-255	-97
-	-73	-15033	-4347	-732	-1329	-8347	-4	*	*											
15	-838	-1100	-812	-1553	-751	-1706	2735	-152	26	301	-2243	860	-3697	994	233	487	511	-811	-6824	-393
-	206	979	-178	-352	-36	372	585	-635	438	-130	-677	-164	41	-73	-335	-54	27	-12	-255	-97
-	-85	-14935	-4124	-732	-1329	-7610	-7	*	*											
16	-1917	-1759	-2516	-1630	-530	-3338	2931	-855	-391	2042	-1515	-1273	-4263	-79	723	-674	-678	-1007	-6707	-1538
-	206	979	-178	-352	-36	372	585	-635	438	-130	-677	-164	41	-73	-335	-54	27	-12	-255	-97
-	-65	-14816	-4507	-732	-1329	-7551	-8	*	*											
17	-826	-1028	-2380	-1478	-1857	-2686	3101	1003	238	-985	-630	-261	-3424	1062	873	-651	888	-3	-4439	-1023
-	206	979	-178	-352	-36	372	585	-635	438	-130	-677	-164	41	-73	-335	-54	27	-12	-255	-97
-	-30	-14726	-5598	-732	-1329	-8598	-4	*	*											
18	-1830	-1394	-2842	-809	-2200	-2648	3324	-112	915	-447	222	-942	-4183	1387	1467	-1072	-295	-209	-2549	-1739
-	206	979	-178	-352	-36	372	585	-635	438	-130	-677	-164	41	-73	-335	-54	27	-12	-255	-97
-	-147	-14683	-3370	-732	-1329	-8629	-4	*	*											
19	-3489	-1950	-3708	-2768	-3104	-3390	4399	-140	-144	-1530	99	-2273	-3370	684	1062	-1820	51	-422	-1262	-2036
-	206	979	-178	-352	-36	372	585	-635	438	-130	-677	-164	41	-73	-335	-54	27	-12	-255	-97
-	-95	-14454	-3975	-732	-1329	-8760	-3	*	*											
20	-2572	-1108	-5317	-940	-3026	-3135	3105	377	907	-1048	837	-1849	-5237	2189	1360	-1684	137	-777	-1488	-1917
-	206	979	-178	-352	-36	372	585	-635	438	-130	-677	-164	41	-73	-335	-54	27	-12	-255	-97
-	-290	-14302	-2455	-732	-1329	-8841	-3	*	*											
21	-2039	-2107	-4863	-3827	-3127	-3908	3678	781	587	-2701	-177	-2678	-5143	-1564	2450	-1589	688	-1339	-3636	-2666
-	206	979	-178	-352	-36	372	585	-635	438	-130	-677	-164	41	-73	-335	-54	27	-12	-255	-97
-	-416	-13813	-1998	-732	-1329	-8708	-3	*	*											
22	-2699	-2243	-4411	-3938	-3424	-3284	3848	2052	-674	-1812	-135	-3164	-4231	-1357	-1729	-1006	1488	159	-1243	-2097
-	206	979	-178	-352	-36	372	585	-635	438	-130	-677	-164	41	-73	-335	-54	27	-12	-255	-97
-	-629	-13206	-1501	-732	-1329	-9426	-2	*	*											
23	-3078	-2305	-3462	-3636	-3320	-2912	4734	-208	-615	-3414	-490	-3448	-3243	-3357	2073	-3338	-3257	-3296	-3539	-3381
-	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*
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RF    no
CS    no
COM   [converted from an old Plan9 HMM]
NSEQ  0
DATE  Mon Mar  8 11:45:48 1999
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NULT       -4  -8455
NULE      595  -1558     85    338   -294    453  -1158    197    249    902  -1085   -142    -21   -313     45    531    201    384  -1998   -644
HMM         A      C      D      E      F      G      H      I      K      L      M      N      P      Q      R      S      T      V      W      Y

        m->m   m->i   m->d   i->m   i->i   d->m   d->d   b->m   m->e
         -11      *  -7037
    1    136    909   -249   -422   -106    302    515   -706    367   -201   -747    927    -30   -143   -405   -124    -44    -83   -325   -167
    -    206    979   -178   -352    -36    372    585   -635    438   -130   -677   -164     41    -73   -335    -54     27    -12   -255    -97
    -    -33  -6059  -7059   -732  -1329    -76  -4293    -11      *
    2    136    909   -249   -422   -106    302    515   -706    367   -201   -747   -235    -30   -143   -405   -124    847    -83   -325   -167
    -    206    979   -178   -352    -36    372    585   -635    438   -130   -677   -164     41    -73   -335    -54     27    -12   -255    -97
    -    -33  -6059  -7059   -732  -1329    -76  -4293      *      *
    3    136    909   -249   -422   -106    302    515   -706    367   -201   -747   -235    -30   -143   -405    657    -44    -83   -325   -167
    -    206    979   -178   -352    -36    372    585   -635    438   -130   -677   -164     41    -73   -335    -54     27    -12   -255    -97
    -    -33  -6059  -7059   -732  -1329    -76  -4293      *      *
    4    136    909   -249   -422   -106    302    515   -706    367   -201   -747   -235    -30   -143   -405    657    -44    -83   -325   -167
    -    206    979   -178   -352    -36    372    585   -635    438   -130   -677   -164     41    -73   -335    -54     27    -12   -255    -97
    -    -33  -6059  -7059   -732  -1329    -76  -4293      *      *
    5    136    909   -249   -422   -106    302    515   -706    367   -201   -747   -235    -30   -143   -405    657    -44    -83   -325   -167
    -    206    979   -178   -352    -36    372    585   -635    438   -130   -677   -164     41    -73   -335    -54     27    -12   -255    -97
    -    -33  -6059  -7059   -732  -1329    -76  -4293      *      *
    6    136    909   -249   -422   -106    302    515   -706    367   -201   -747   -235    961   -143   -405   -124    -44    -83   -325   -167
    -    206    979   -178   -352    -36    372    585   -635    438   -130   -677   -164     41    -73   -335    -54     27    -12   -255    -97
    -    -33  -6059  -7059   -732  -1329    -76  -4293      *      *
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    -    -33  -6059  -7059   -732  -1329    -76  -4293      *      *
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    -    -33  -6059  -7059   -732  -1329    -76  -4293      *      *
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    -    -33  -6059  -7059   -732  -1329    -76  -4293      *      *
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24	30	606	-552	327	-56	-1	1018	-1009	218	-504	-1050	-51	310	947	-708	201	172	-104	-628	-470
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26	-149	1887	-486	141	272	17	230	-174	351	-266	-1032	-171	167	-428	-690	135	188	-367	-610	320
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28	-191	582	102	-391	-433	-25	998	-1032	41	446	-1074	-244	-357	903	-122	193	109	-150	-652	-494
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45	321	582	148	304	487	-25	188	-655	521	184	-1074	-489	-357	-359	246	-208	-227	-127	-652	-494
-	206	979	-178	-352	-36	372	585	-635	438	-130	-677	-164	41	-73	-335	-54	27	-12	-255	-97

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46	23	582	398	-175	80	25	188	172	928	82	1074	200	154	-470	199	451	370	176	-652	494
	206	979	178	-352	-36	372	585	-635	438	-130	677	164	41	73	335	54	27	12	255	97
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47	191	582	199	-749	-433	214	188	-92	718	340	-1074	-561	357	-470	-111	454	81	-230	652	291
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48	371	608	-121	-99	-407	1	214	-13	748	-182	-1048	225	-331	59	-659	-425	-345	-123	-626	891
-	206	979	-178	-352	-36	372	585	-635	438	-130	-677	-164	41	-73	-335	-54	27	-12	-255	-97
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49	-191	1461	-576	655	-433	514	188	-1032	375	-180	-1074	-456	-357	-470	-119	-63	-370	146	-652	856
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-	-14	-7248	-8248	-732	-1329	-4354	-72	*	*											
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51	612	582	-576	118	-162	132	188	396	378	169	-1074	-561	-357	-21	-732	-451	-18	-203	-652	130
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52	-191	582	-576	473	2	466	188	443	226	121	-1074	-75	-357	-55	-732	-63	-370	-409	-652	391
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53	572	1085	-576	-156	66	-25	833	-85	658	58	-1074	-561	-357	-359	-732	-451	-140	-409	-652	897
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55	191	1546	-576	-63	203	144	188	212	898	-41	-1074	-561	-357	-470	-732	126	346	-409	-652	-494
-	206	979	-178	-352	-36	372	585	-635	438	-130	-677	-164	41	-73	-335	-54	27	-12	-255	-97
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59	241	582	-576	-156	743	-25	188	-644	41	-201	-1074	54	-33	1022	-732	-149	280	61	-652	-494
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61	127	582	-101	261	-433	395	188	-655	41	-273	290	102	-357	-470	-40	-19	289	67	-652	58
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-	206	979	-178	-352	-36	372	585	-635	438	-130	677	-164	41	-73	-335	-54	27	-12	-255	-97
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-	206	979	-178	-352	-36	372	585	-635	438	-130	-677	-164	41	-73	-335	-54	27	-12	-255	-97
-	-14	7248	8248	-732	-1329	-4354	-72	*	*											
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-	206	979	-178	-352	-36	372	585	-635	438	-130	-677	-164	41	-73	-335	-54	27	-12	-255	-97
-	-15	-7210	-8210	-732	-1329	-4362	-72	*	*											
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-	-15	-7210	-8210	-732	-1329	-4362	-72	*	*											
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69	107	630	250	156	-56	519	993	-887	88	-480	828	-514	204	-422	-684	502	-323	-362	-604	107
-	206	979	-178	-352	-36	372	585	-635	438	-130	-677	-164	41	-73	-335	-54	27	-12	-255	-97
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70	56	612	474	-36	-403	340	218	-326	412	-172	399	-45	-327	10	-279	351	341	262	-622	-464
-	206	979	-178	-352	-36	372	585	-635	438	-130	-677	-164	41	-73	-335	-54	27	12	-255	97
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-	206	979	178	-352	-36	372	585	-635	438	-130	-677	-164	41	-73	-335	-54	27	-12	-255	97
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72	-35	612	35	-720	-403	5	218	-186	140	244	1203	-207	74	-440	-214	15	-341	-336	-622	855
-	206	979	178	-352	-36	372	585	-635	438	-130	-677	-164	41	-73	-335	-54	27	-12	-255	-97
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73	-176	598	-560	504	-417	-9	363	-1017	716	9	306	73	-341	202	-74	13	-355	-394	-636	584
-	206	979	-178	-352	-36	372	585	-635	438	-130	-677	-164	41	-73	-335	-54	27	-12	-255	-97
-	-15	7206	-8206	732	-1329	-4363	-72	*	*											
74	-176	598	560	165	88	-9	204	-1017	317	-152	-841	-546	-341	804	330	182	-355	292	-636	456
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75	-176	598	61	192	-311	202	772	-1017	228	-137	-97	-546	-341	462	206	-138	-355	364	-636	231
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78	127	582	576	622	183	295	995	-1032	487	-309	-1074	-561	-357	263	416	-187	-370	-87	-652	-494
-	206	979	178	-352	-36	372	585	-635	438	-130	-677	-164	41	-73	-335	-54	27	-12	-255	-97
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79	191	1302	48	391	-433	-25	893	-138	434	78	89	-561	357	214	105	27	-370	13	652	59
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80	191	1451	5	-391	-32	372	188	-278	378	299	-269	-561	-357	-470	-259	-5	-370	-87	-652	519
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81	-191	582	102	-391	809	-25	188	115	41	223	1074	-561	-357	-470	169	166	-370	-409	-652	828
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82	423	582	-576	-749	496	-25	998	-1032	226	-3	1132	-561	-357	-470	70	-451	-370	139	-652	876
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83	175	1302	102	-229	-433	-25	1302	-507	621	-309	685	-561	-357	-470	-309	-239	-370	-83	-652	618
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84	123	1392	576	-160	60	-25	188	-681	406	416	-1074	-81	-357	-470	-111	456	-370	-51	-652	-494
-	206	979	-178	-352	-36	372	585	-635	438	-130	-677	-164	41	-73	-335	-54	27	-12	-255	-97
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85	129	1836	576	-113	54	-25	188	-570	41	304	-4	-561	-357	174	-732	504	-370	13	-652	-494
-	206	979	-178	-352	-36	372	585	-635	438	-130	-677	-164	41	-73	-335	-54	27	-12	-255	-97
	14	-7248	-8248	-732	-1329	-4354	-72	*	*											
86	58	1289	216	338	-433	372	188	-1032	41	121	1293	54	-357	-21	-732	-153	-370	-409	-652	-494
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87	177	582	576	216	-433	-25	188	-500	526	208	290	-134	-357	-55	-388	201	-140	111	-652	-494
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89	191	1875	576	-101	-433	-25	188	387	41	141	394	-561	-357	-470	-244	190	-370	374	-652	-494
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	-14	-7248	-8248	-732	-1329	-4354	-72	*	*											
90	332	1342	-576	-26	-433	-25	1064	-655	271	360	-1074	385	-357	-55	-732	-451	-370	385	-652	-494
-	206	979	-178	-352	-36	372	585	-635	438	-130	-677	-164	41	-73	-335	-54	27	-12	-255	-97
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91	223	582	380	339	275	-25	188	-1032	390	224	-1074	54	-357	552	-732	-451	83	-409	-652	-494
	206	979	-178	-352	-36	372	585	-635	438	-130	-677	-164	41	-73	-335	-54	27	-12	-255	-97
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92	497	582	-576	792	183	-25	905	-278	41	158	-1074	176	-357	-470	-732	-154	-227	-409	-652	-494
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-	-14	-7248	-8248	-732	-1329	-4354	-72	*	*											
93	123	582	-576	-219	555	-25	188	235	597	-527	-1074	-134	-357	462	-308	-451	253	67	-652	387
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94	-191	582	-200	-219	54	-25	1064	-1032	555	19	-1074	-69	154	-470	-90	153	83	33	-652	278
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95	-163	610	-548	-254	306	3	776	-1005	529	108	-1046	198	-329	-442	548	377	-343	35	-624	-466
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-	87	7166	-4276	732	1329	4368	-72	*	*										
96	229	634	524	698	282	27	240	248	304	302	1022	-17	-305	418	59	90	29	-35	-600	-442
	206	979	178	-352	36	372	585	635	438	-130	-677	-164	41	-73	-335	-54	27	-12	-255	-97
-	93	-7095	-4174	-732	1329	4379	-71	*	*											
97	226	658	-499	-673	77	322	646	-956	117	328	-997	-485	44	56	-174	247	-294	-6	-576	468
-	206	979	-178	-352	-36	372	585	-635	438	-130	-677	-164	41	-73	-335	54	27	-12	-255	-97
-	-17	-7019	-8019	-732	-1329	-4390	-70	*	*											
98	-115	658	234	-264	-357	208	765	-956	117	149	-997	870	-280	-394	-656	375	-294	-333	-576	411
-	206	979	-178	-352	-36	372	585	-635	438	-130	-677	-164	41	-73	-335	-54	27	-12	-255	-97
-	-112	-7019	-3902	-732	-1329	-4390	-70	*	*											
99	318	688	-165	174	108	80	293	-234	146	-174	989	38	-251	-364	-626	70	-265	-56	-546	-388
-	206	979	-178	-352	-36	372	585	-635	438	-130	-677	-164	41	-73	-335	-54	27	-12	-255	-97
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100	185	1595	714	-616	-300	108	666	-899	174	-139	-941	-80	-223	86	11	170	-237	-276	-519	-361
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-	206	979	-178	-352	-36	372	585	-635	438	-130	-677	-164	41	-73	-335	-54	27	-12	-255	-97
-	-19	6832	-7832	-732	-1329	4416	-69	*	*											
102	185	715	-443	-616	575	108	1035	-899	386	491	-941	-428	183	-337	-599	178	-237	-276	-519	-361
-	206	979	-178	-352	-36	372	585	-635	438	-130	-677	-164	41	-73	-335	-54	27	-12	-255	-97
-	-19	6832	-7832	-732	-1329	-4416	-69	*	*											
103	157	715	-443	32	-300	380	731	-899	174	233	-941	59	-223	-337	280	80	-237	-65	-519	-361
-	206	979	-178	-352	-36	372	585	-635	438	-130	-677	-164	41	-73	-335	-54	27	-12	-255	-97
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104	-58	1759	-443	-213	-300	108	321	-818	480	154	-134	80	-223	-337	-599	-318	-237	677	-519	361
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105	127	685	-95	-646	-330	78	291	-23	144	573	-971	-458	-253	-367	-629	466	-267	214	-549	-391
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-	-18	-6934	-7934	-732	-1329	-4008	-93	*	*											
106	266	636	-522	-39	-379	29	242	-316	95	160	284	303	279	-416	-196	-14	-317	175	-598	-440
-	206	979	-178	-352	-36	372	585	-635	438	-130	-677	-164	41	-73	-335	-54	27	-12	-255	-97
-	-16	-7091	-8091	-732	-1329	-4381	-71	*	*											
107	181	636	-522	-4	392	29	769	-514	95	-298	808	121	201	342	331	-397	-317	-356	-598	-440
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109	109	1019	-373	-315	626	1	1384	-310	66	-502	-1048	-138	182	-444	-706	354	364	-102	-626	-468
-	206	979	-178	-352	-36	372	585	-635	438	-130	-677	-164	41	-73	-335	-54	27	-12	-255	-97
-	-15	-7173	-8173	-732	-1329	-4139	-84	*	*											
110	537	582	-576	-749	1140	-25	763	-434	473	-527	459	-561	641	-470	-732	-36	-370	-409	-652	123
-	206	979	-178	-352	-36	372	585	-635	438	-130	-677	-164	41	-73	-335	-54	27	-12	-255	-97
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111	54	613	0	-718	234	245	1103	-1001	72	-97	-1043	-135	582	-439	315	-156	-339	38	1145	-463
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-	-15	-7156	-8156	-732	-1329	-4369	-72	*	*											
112	-160	1190	-116	-428	-402	6	946	19	240	243	-1043	-530	-325	-439	568	-420	401	-378	973	-463

	-	206	979	-178	352	-36	372	585	-635	438	-130	677	-164	41	-73	-335	-54	27	-12	-255	-97
		15	-7156	8156	-732	1329	4100	-87	*	*											
	-113	191	582	-576	-166	278	-25	188	244	41	-87	331	-561	280	-470	732	264	583	178	-652	58
	-	206	979	-178	-352	-36	372	585	-635	438	-130	677	-164	41	-73	-335	-54	27	-12	-255	-97
	-	-14	-7248	-8248	732	1329	-4354	-72	*	*											
	114	235	825	576	-156	230	-25	188	-18	41	267	-1074	-561	682	-470	-732	348	-370	97	-652	-494
	-	206	979	-178	-352	-36	372	585	-635	438	-130	-677	-164	41	-73	-335	-54	27	-12	-255	-97
	-	-14	7248	-8248	-732	1329	-4354	-72	*	*											
	115	331	1086	-576	-236	60	372	188	-1032	41	30	649	-561	187	-470	-309	-153	83	65	1120	-494
		206	979	-178	-352	-36	372	585	-635	438	-130	-677	-164	41	-73	-335	-54	27	-12	-255	-97
	-	-14	-7248	-8248	-732	-1329	-4354	-72	*	*											
	116	624	1565	-576	-749	-433	290	188	-278	41	108	-1074	200	-357	33	-732	-187	81	-1	1032	-494
		206	979	-178	-352	-36	372	585	-635	438	-130	-677	-164	41	-73	-335	-54	27	-12	-255	-97
	-	-106	-7248	-3962	-732	-1329	-4354	-72	*	*											
	117	165	1770	76	-718	91	6	933	210	72	240	-1043	-530	-325	-439	-701	132	173	-378	-621	-463
	-	206	979	-178	-352	-36	372	585	-635	438	-130	-677	-164	41	-73	-335	-54	27	-12	-255	-97
		-15	7156	-8156	-732	-1329	-4369	-72	*	*											
	118	89	2367	7	125	-402	6	219	-297	414	-123	-1043	-530	-325	-439	-701	-156	376	-378	-621	-10
	-	206	979	-178	-352	-36	372	585	-635	438	-130	-677	-164	41	-73	-335	-54	27	-12	-255	-97
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	119	392	613	-166	-117	-402	6	219	-1001	72	165	-1043	-530	-325	578	-701	98	112	661	-621	-463
		206	979	-178	-352	-36	372	585	-635	438	-130	-677	-164	41	-73	-335	-54	27	-12	-255	-97
	-	15	-7156	-8156	732	-1329	-4369	-72	*	*											
	120	83	613	-544	392	225	6	219	-887	72	217	-1043	-103	257	197	-357	-420	-339	623	-621	463
	-	206	979	-178	-352	-36	372	585	-635	438	-130	-677	-164	41	-73	-335	-54	27	-12	255	97
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		206	979	-178	-352	-36	372	585	-635	438	-130	-677	-164	41	-73	-335	-54	27	12	255	97
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	122	79	637	322	-694	238	30	243	-375	96	330	-1018	-506	-301	-415	-677	-396	232	596	-597	443
	-	206	979	-178	-352	-36	372	585	-635	438	-130	-677	-164	41	-73	-335	-54	27	-12	255	97
	-	-16	7084	-8084	-732	-1329	-4381	-71	*	*											
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	-	206	979	-178	-352	-36	372	585	-635	438	-130	-677	-164	41	-73	-335	-54	27	-12	-255	-97
	-	-16	-7084	8084	732	-1329	-4381	-71	*	*											
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	-	206	979	-178	-352	-36	372	585	-635	438	-130	-677	-164	41	-73	-335	-54	27	-12	-255	-97
	-	-73	-7084	-4563	-732	-1329	-4112	-86	*	*											
	125	451	624	-534	-708	838	17	805	-324	475	-486	-1032	-172	229	-428	-690	351	-20	-368	-610	320
	-	206	979	-178	-352	-36	372	585	-635	438	-130	-677	-164	41	-73	-335	-54	27	-12	-255	-97
	-	-16	-7129	-8129	-732	-1329	-3228	-163	*	*											
	126	-328	445	-336	-886	420	-162	579	-503	458	-489	-1211	-698	143	-607	-444	1223	-159	-72	-789	821
	-	206	979	-178	-352	-36	372	585	-635	438	-130	-677	-164	41	-73	-335	-54	27	-12	-255	-97
	-	-11	-7618	8618	-732	-1329	-4287	-76	*	*											
	127	-328	445	-407	-363	659	-162	51	-419	376	-446	-1211	-698	-98	-607	-869	-157	1549	-138	-789	700
	-	206	979	-178	-352	-36	372	585	-635	438	-130	-677	-164	41	-73	-335	-54	27	-12	-255	-97
	-	-118	-7618	3763	-732	-1329	-4287	-76	*	*											
	128	-185	488	-669	-249	138	-70	94	100	-53	-621	-1167	-35	-450	-564	-826	1430	-150	-172	594	303
	-	206	979	-178	-352	-36	372	585	-635	438	-130	-677	-164	41	-73	-335	-54	27	-12	-255	-97
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129	119	488	-669	328	399	52	94	-209	345	-621	1167	-655	-450	1870	264	276	-464	28	746	243
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	-55	7517	-4959	-732	1329	4099	-87	*	*											
130	286	487	-671	-196	528	120	93	-1128	312	-374	1169	1755	268	-112	827	-351	155	786	747	589
	206	979	178	-352	-36	372	585	-635	438	-130	677	-164	41	-73	335	-54	27	12	255	97
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131	164	465	-386	-866	-550	142	71	499	-76	928	398	125	-20	-587	-235	-568	-438	228	455	-611
	206	979	-178	-352	-36	372	585	-635	438	-130	-677	-164	41	-73	-335	-54	27	-12	-255	-97
	-11	-7572	-8572	-732	-1329	-4302	-75	*	*											
132	308	465	1507	-268	221	135	789	221	-76	-145	109	-678	-474	-587	-156	-389	-487	-207	-769	-611
	206	979	-178	-352	-36	372	585	-635	438	-130	-677	-164	41	-73	-335	-54	27	-12	-255	-97
	-11	-7572	-8572	-732	-1329	-4263	-77	*	*											
133	-311	462	231	62	406	-95	68	-1152	-79	-428	-1194	-134	-476	-3	-249	1408	-490	-51	-772	-614
	206	979	-178	-352	-36	372	585	-635	438	-130	-677	-164	41	-73	-335	-54	27	-12	-255	-97
	-56	7579	-4941	-732	-1329	-4300	-75	*	*											
134	-193	480	-253	111	-179	1410	173	-1134	-61	-629	-1176	-33	53	-572	-834	124	-473	619	-754	-596
	206	979	-178	-352	-36	372	585	-635	438	-130	-677	-164	41	-73	-335	-54	27	-12	-255	-97
	12	7539	8539	-732	-1329	4150	-84	*	*											
135	10	464	-694	87	-552	71	69	-321	-78	-259	-1192	-680	353	-588	-850	-266	1616	129	-770	-338
	206	979	-178	-352	-36	372	585	-635	438	-130	-677	-164	41	-73	-335	-54	27	-12	-255	-97
	-11	7579	-8579	-732	-1329	-4305	-75	*	*											
136	-310	464	1572	-353	-552	218	947	-445	185	-141	-1192	-191	-475	-588	-151	-332	-175	-113	273	-612
	206	979	-178	-352	-36	372	585	-635	438	-130	-677	-164	41	-73	-335	-54	27	-12	-255	-97
	-11	-7579	-8579	-732	-1329	-4305	-75	*	*											
137	-24	464	-312	-868	-552	366	69	-770	-78	1171	-1192	-249	39	-588	-131	111	-489	-528	770	344
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	11	7579	-8579	-732	-1329	-4069	-89	*	*											
138	-332	441	-717	162	-86	78	924	-1174	-100	105	-1215	-703	-498	-611	-259	1501	-226	550	793	8
	206	979	-178	-352	-36	372	585	-635	438	-130	-677	-164	41	-73	-335	-54	27	12	255	97
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139	348	425	23	516	1981	-182	31	-1190	115	-685	-143	-369	-246	-627	-196	254	-60	-566	-809	-651
	206	979	-178	-352	-36	372	585	-635	438	-130	-677	-164	41	-73	-335	-54	27	-12	-255	-97
	-11	7669	-8669	-732	-1329	-4281	-76	*	*											
140	-133	425	181	-351	223	182	31	-1190	-116	-195	-143	-512	1598	-627	228	-608	-76	-338	-809	305
	206	979	-178	-352	-36	372	585	-635	438	-130	-677	-164	41	-73	-335	-54	27	-12	-255	-97
	-11	-7669	-8669	-732	-1329	-4281	-76	*	*											
141	-348	425	-194	-906	233	408	31	-1190	714	73	207	-719	164	-627	-889	-608	-294	-566	3283	-33
	206	979	-178	-352	-36	372	585	-635	438	-130	-677	-164	41	-73	-335	-54	27	-12	-255	-97
	-11	-7669	-8669	-732	-1329	-4053	-90	*	*											
142	-365	408	-373	-923	685	-199	14	1270	128	-93	37	-387	-124	-644	-293	125	-544	283	398	-668
	206	979	-178	-352	-36	372	585	-635	438	-130	-677	-164	41	-73	-335	-54	27	-12	-255	-97
	-10	-7705	-8705	-732	-1329	-4265	-77	*	*											
143	-115	408	-750	-923	324	-199	731	-108	259	932	-1248	-735	565	-644	-210	-210	-93	71	-826	-668
	206	979	-178	-352	-36	372	585	-635	438	-130	-677	-164	41	-73	-335	-54	27	-12	-255	-97
	-10	-7705	-8705	-732	-1329	-4265	-77	*	*											
144	-47	408	-126	-275	-58	-199	820	-688	352	-198	-1248	1633	-8	-644	-257	-625	-544	-256	1418	-115
	206	979	-178	-352	-36	372	585	-635	438	-130	-677	-164	41	-73	-335	-54	27	-12	-255	-97
	-10	-7705	-8705	-732	-1329	-4265	-77	*	*											
145	-193	408	-169	-520	17	199	719	-378	98	-128	195	177	-531	-644	-906	-323	-544	1498	810	-668
	206	979	-178	-352	-36	372	585	-635	438	-130	-677	-164	41	-73	-335	-54	27	-12	-255	-97

-	-10	-7705	-8705	732	-1329	-4265	-77	*	*										
146	92	408	205	-509	381	199	14	299	-133	1051	117	-37	531	644	906	-2	-492	284	826	-668
-	206	979	-178	352	-36	372	585	-635	438	-130	-677	-164	41	73	335	-54	27	-12	-255	-97
-	-10	-7705	-8705	-732	1329	4265	-77	*	*											
147	-365	408	-157	7	120	-199	14	-109	262	246	-1248	1773	-531	-644	-906	52	-544	-141	-826	-668
-	206	979	-178	352	-36	372	585	-635	438	-130	-677	-164	41	-73	-335	-54	27	-12	-255	-97
-	-10	-7705	-8705	732	1329	-4265	-77	*	*											
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-	-10	-7705	-8705	732	-1329	-4265	-77	*	*											
149	113	978	-750	37	228	47	772	-552	1698	-41	-1248	-735	-531	-644	-906	-361	-544	-265	-826	-215
-	206	979	-178	-352	-36	372	585	-635	438	-130	-677	-164	41	-73	-335	-54	27	-12	-255	-97
-	-10	-7705	-8705	732	-1329	-4265	-77	*	*											
150	1187	408	-93	400	121	44	14	-544	258	-40	-1248	2	-531	3	-906	-382	-544	-265	-826	-668
-	206	979	-178	-352	-36	372	585	-635	438	-130	-677	-164	41	-73	-335	-54	27	-12	-255	-97
-	-10	-7705	-8705	-732	-1329	-4265	-77	*	*											
151	-150	408	-17	-17	1781	-199	14	0	-79	-244	-1248	129	-531	86	-906	-177	-187	187	-826	-668
-	206	979	-178	-352	-36	372	585	-635	438	-130	-677	-164	41	-73	-335	-54	27	-12	-255	-97
-	-10	-7705	-8705	-732	-1329	-4265	-77	*	*											
152	-149	408	1450	-403	-171	198	582	339	98	-211	-1248	-735	216	220	-906	9	-544	-583	-826	-668
-	206	979	-178	352	-36	372	585	-635	438	-130	-677	-164	41	-73	-335	-54	27	-12	-255	-97
-	-10	-7705	8705	-732	1329	-4265	-77	*	*											
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	206	979	-178	-352	-36	372	585	-635	438	-130	-677	-164	41	-73	-335	-54	27	12	255	97
-	-10	-7705	-8705	-732	1329	-4265	-77	*	*											
154	-80	1287	-315	547	918	-199	14	-1206	-133	-180	-1248	-735	-446	-644	-906	70	544	583	826	2189
-	206	979	-178	352	-36	372	585	-635	438	-130	-677	-164	41	-73	335	54	27	12	255	-97
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155	-365	408	-750	184	206	12	644	-1206	1495	-447	587	-735	-531	90	-152	-179	-197	-169	826	267
-	206	979	-178	-352	36	372	585	-635	438	-130	-677	-164	41	-73	-335	-54	27	-12	255	-97
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156	-45	408	-192	-275	685	-199	14	-216	98	-328	-1248	-307	-531	40	32	-1	-544	1265	-826	-668
-	206	979	-178	-352	-36	372	585	-635	438	-130	-677	-164	41	-73	-335	-54	27	-12	-255	-97
-	-10	-7705	-8705	-732	-1329	-4265	-77	*	*											
157	1	408	-327	923	31	-199	1100	1424	291	72	-1248	-735	-531	-229	-906	-625	-544	140	789	300
-	206	979	-178	-352	-36	372	585	-635	438	-130	-677	-164	41	-73	-335	-54	27	-12	-255	-97
-	-10	-7705	-8705	-732	-1329	-4265	-77	*	*											
158	89	408	-750	1609	-607	-199	14	-337	645	-354	-189	-735	-531	-644	-906	-625	-236	-63	940	130
-	206	979	-178	-352	-36	372	585	-635	438	-130	-677	-164	41	-73	-335	-54	27	-12	-255	-97
-	-10	-7705	-8705	-732	-1329	-4265	-77	*	*											
159	-365	408	-750	345	-607	-199	14	-52	787	-701	-1248	-735	-531	-644	-482	1295	-28	176	768	-668
-	206	979	-178	352	-36	372	585	-635	438	-130	-677	-164	41	-73	-335	-54	27	-12	-255	-97
-	-10	-7705	8705	-732	-1329	-4265	-77	*	*											
160	-365	408	750	-232	1781	254	890	150	128	-326	-1248	-37	-531	-644	-906	-7	246	-159	-826	-668
-	206	979	-178	-352	-36	372	585	-635	438	-130	-677	-164	41	-73	-335	-54	27	-12	-255	-97
-	-10	-7705	-8705	-732	-1329	-4265	-77	*	*											
161	3	408	-321	-47	-171	-199	575	1417	-133	189	-287	764	-531	-644	-906	-234	-544	-583	-826	-668
-	206	979	-178	-352	-36	372	585	-635	438	-130	-677	-164	41	-73	-335	-54	27	-12	-255	-97
-	-10	-7705	-8705	-732	-1329	-4265	-77	*	*											
162	-24	408	-750	-391	-107	-199	14	-133	1495	-110	-1248	414	-20	-644	-906	117	-544	-55	947	-668

	206	979	178	352	-36	372	585	-635	438	-130	677	-164	41	73	-335	-54	27	12	-255	97
	-10	-7705	8705	732	1329	4265	-77	*	*											
163	1323	652	750	520	-58	-199	14	-1206	297	-375	-177	-735	531	150	296	169	76	103	858	-668
-	206	979	178	-352	36	372	585	-635	438	-130	677	-164	41	73	-335	-54	27	12	255	-97
-	-10	-7705	8705	732	-1329	-4265	-77	*	*											
164	124	408	750	1350	31	-199	885	367	-133	-328	-1248	-376	-531	-644	139	-625	-62	-324	-826	117
-	206	979	178	352	-36	372	585	-635	438	-130	-677	-164	41	73	-335	-54	27	-12	-255	-97
-	-86	-7705	-4234	-732	-1329	-2935	-202	*	*											
165	534	804	1636	37	-776	976	424	-690	-302	-134	-1416	357	-699	-813	-56	-794	-359	-752	773	-836
	206	979	178	352	-36	372	585	-635	438	-130	-677	-164	41	73	-335	-54	27	-12	-255	-97
-	-8	-8085	-9085	732	-1329	-4167	-83	*	*											
166	-252	240	918	502	-776	-154	745	-1375	327	-870	-607	1402	-699	-813	-1075	1502	-713	-752	602	-836
-	206	979	178	352	-36	372	585	-635	438	-130	-677	-164	41	73	-335	-54	27	-12	-255	-97
-	-8	-8085	-9085	732	-1329	-4167	-83	*	*											
167	191	240	825	464	-776	-368	408	-996	-302	641	-1416	-471	1688	-17	-171	-377	-713	-487	-994	-836
-	206	979	178	352	-36	372	585	-635	438	-130	-677	-164	41	73	-335	-54	27	-12	-255	-97
-	-8	-8085	-9085	732	-1329	-4167	-83	*	*											
168	61	744	432	360	776	-173	560	-142	121	1225	-1416	-904	-699	-813	-598	-794	1140	-752	-994	-836
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-	-8	-8085	-9085	-732	1329	-4167	-83	*	*											
169	376	707	918	791	1901	42	653	-855	-302	330	-1416	-554	-385	-301	-570	-794	-401	-335	783	-836
	206	979	178	352	-36	372	585	-635	438	-130	-677	-164	41	73	-335	-54	27	-12	-255	-97
	-8	-8085	9085	732	-1329	-4031	-91	*	*											
170	77	229	1698	17	787	-379	869	-1386	998	-24	-367	-81	-302	824	-658	-570	724	763	680	-847
-	206	979	178	-352	-36	372	585	-635	438	-130	-677	-164	41	73	-335	-54	27	-12	255	-97
	234	-8107	2777	732	1329	-3854	-103	*	*											
171	151	943	852	176	-710	302	788	-1309	-236	1169	769	-441	-633	-746	178	310	-647	-686	928	770
	206	979	178	352	-36	372	585	-635	438	-130	-677	-164	41	-73	-335	-54	27	-12	255	-97
	-9	-7943	8943	-732	-1329	-4206	-80	*	*											
172	170	306	852	610	-710	-302	-89	1784	-20	106	-384	-218	-633	-746	417	-110	-182	-686	928	-770
-	206	979	178	352	-36	372	585	-635	438	-130	-677	-164	41	-73	-335	-54	27	-12	-255	-97
-	-9	-7943	-8943	-732	-1329	-4206	-80	*	*											
173	179	718	-567	-170	-710	-302	334	-843	1862	-78	-388	-139	-633	93	155	-380	-647	-686	-928	-770
	206	979	178	-352	-36	372	585	-635	438	-130	-677	-164	41	-73	-335	-54	27	-12	-255	-97
	-9	-7943	8943	732	1329	-4206	-80	*	*											
174	177	306	-764	116	-710	-302	1737	-1309	229	-602	134	-92	-633	1978	-316	-728	-647	-98	951	-770
-	206	979	178	352	-36	372	585	-635	438	-130	-677	-164	41	-73	-335	-54	27	-12	-255	-97
-	-9	-7943	-8943	-732	-1329	-4206	-80	*	*											
175	-126	306	-852	1026	-710	14	717	-879	196	-13	-24	-838	-633	-102	-65	1490	-647	375	408	-770
-	206	979	178	-352	-36	372	585	-635	438	-130	-677	-164	41	-73	-335	-54	27	-12	-255	-97
-	-9	-7943	-8943	732	-1329	-4206	-80	*	*											
176	-98	306	852	-29	-710	-302	489	-628	1829	-143	-1350	-436	312	136	-663	-312	-81	-277	-928	-770
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-	-41	-7943	-5400	-732	-1329	-4206	-80	*	*											
177	60	320	1757	-650	-695	-287	1371	-916	480	-257	-1336	-119	-114	-732	-138	118	-632	-671	-914	-756
-	206	979	178	-352	-36	372	585	-635	438	-130	-677	-164	41	-73	-335	-54	27	-12	-255	-97
-	-9	-7912	-8912	-732	-1329	-4216	-80	*	*											
178	-453	1776	14	-490	-200	-287	490	-1294	10	-75	-528	165	-618	-732	1787	60	-632	-671	309	-485
-	206	979	-178	-352	-36	372	585	-635	438	-130	-677	-164	41	-73	-335	-54	27	-12	-255	-97
-	-9	-7912	-8912	-732	-1329	-4216	-80	*	*											

179	-453	1359	837	1795	-695	-287	-74	1294	-221	-278	1336	537	18	732	-345	295	-632	193	914	-756
	206	979	178	352	-36	372	585	635	438	-130	677	-164	41	-73	335	-54	27	12	255	-97
	-37	-7912	-5567	-732	-1329	-4216	-80	*	*											
180	-440	333	825	555	-682	1500	928	-1282	-208	-169	-24	-811	19	-146	498	302	620	216	901	743
-	206	979	178	352	-36	372	585	-635	438	-130	-677	-164	41	-73	-335	-54	27	12	-255	-97
-	-108	-7884	3876	-732	-1329	4080	-88	*	*											
181	-91	364	23	-551	-651	-243	475	113	-178	-348	-1292	-780	2002	-266	225	-395	-569	-628	1010	-712
	206	979	-178	352	-36	372	585	635	438	-130	-677	-164	41	-73	-335	-54	27	-12	255	-97
	-10	-7815	-8815	732	-1329	-4245	-78	*	*											
182	237	1371	-116	358	-163	-243	-30	-96	-178	-746	-1292	-780	-61	-688	-523	-51	1705	-628	741	-712
-	206	979	-178	-352	-36	372	585	-635	438	-130	-677	-164	41	-73	-335	-54	27	-12	-255	-97
-	-10	-7815	-8815	-732	-1329	-4035	-91	*	*											
183	429	1423	1752	907	-671	-263	-50	-804	-197	-561	360	-799	-243	-189	179	-689	-609	-647	150	-732
-	206	979	-178	-352	-36	372	585	-635	438	-130	-677	-164	41	-73	-335	-54	27	-12	-255	-97
-	-9	-7859	-8859	-732	-1329	-4232	-79	*	*											
184	-429	344	-814	547	-671	-263	2958	-400	145	-46	-344	-799	-595	105	-970	-298	-27	-238	-890	-732
-	206	979	178	-352	-36	372	585	-635	438	-130	-677	-164	41	-73	-335	-54	27	-12	-255	-97
	-113	-7859	-3814	-732	-1329	-4232	-79	*	*											
185	-384	858	-768	-580	-190	97	-5	260	-152	1170	-1266	-754	-35	-446	134	213	-563	-278	-844	-686
-	206	979	-178	-352	-36	372	585	-635	438	-130	-677	-164	41	-73	-335	-54	27	-12	-255	-97
-	-10	-7757	-8757	-732	-1329	-4117	-86	*	*											
186	-397	376	314	1617	-22	-231	-18	-204	390	169	-367	-767	-562	-676	-938	-60	-576	-615	-858	-699
-	206	979	-178	-352	-36	372	585	-635	438	-130	-677	-164	41	-73	-335	-54	27	-12	-255	-97
-	-10	-7787	-8787	-732	-1329	-4026	-91	*	*											
187	185	355	-318	203	-661	-253	-40	-1260	-187	-344	29	-27	-79	-193	-346	1582	-598	-355	-879	-721
-	206	979	-178	352	-36	372	585	-635	438	-130	-677	-164	41	-73	-335	-54	27	-12	255	-97
-	-10	-7836	-8836	-732	-1329	-4239	-78	*	*											
188	1439	355	803	37	-661	-253	599	-445	-187	-430	-214	-180	-299	-697	-566	78	-598	-194	1531	-95
	206	979	-178	-352	-36	372	585	-635	438	-130	-677	-164	41	-73	-335	-54	27	-12	-255	-97
	-10	-7836	-8836	-732	-1329	-4239	-78	*	*											
189	-167	3398	803	-640	156	-253	-40	-555	271	244	-1301	362	-584	-697	-960	-378	-598	-637	350	62
-	206	979	178	-352	-36	372	585	-635	438	-130	-677	-164	41	-73	-335	-54	27	-12	-255	-97
	-10	-7836	-8836	-732	-1329	-4239	-78	*	*											
190	147	355	-803	-573	601	-253	-40	-1260	29	-242	-1301	261	1878	-247	-204	85	-598	-637	488	-721
	206	979	178	-352	-36	372	585	-635	438	-130	-677	-164	41	-73	-335	-54	27	-12	-255	-97
	-79	-7836	4354	-732	-1329	-2785	-226	*	*											
191	-273	166	1705	-23	-849	-242	-228	-1448	-375	868	-1490	-547	-227	-886	-670	-86	-786	-304	1657	-910
-	206	979	-178	-352	-36	372	585	-635	438	-130	-677	-164	41	-73	-335	-54	27	-12	-255	-97
-	-53	-8233	4932	-732	-1329	-4121	-85	*	*											
192	-385	190	-585	-736	-196	-418	-205	-768	516	-451	-1466	1898	-749	-863	-1125	1402	-563	-802	617	-886
-	206	979	-178	-352	-36	372	585	-635	438	-130	-677	-164	41	-73	-335	-54	27	-12	-255	-97
-	-7	-8187	-9187	-732	-1329	-3869	-102	*	*											
193	-607	166	613	-1165	-413	246	-156	-531	-375	916	-1490	-136	1918	-572	-203	-164	-426	-825	-1068	-910
-	206	979	-178	-352	-36	372	585	-635	438	-130	-677	-164	41	-73	-335	-54	27	-12	-255	-97
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194	-607	166	521	-747	-184	-441	-228	-1448	52	1068	-1490	400	1689	-380	-721	-220	-220	-409	-1068	-910
-	206	979	-178	-352	-36	372	585	-635	438	-130	-677	-164	41	-73	-335	-54	27	-12	-255	-97
-	-7	-8233	-9233	-732	-1329	-4121	-85	*	*											
195	-287	1047	-490	-302	1995	-130	-228	-1448	-375	935	-1490	-977	-772	-517	-1148	194	129	-825	-1068	-387
-	206	979	-178	-352	-36	372	585	-635	438	-130	-677	-164	41	-73	-335	-54	27	-12	-255	-97

-	-7	-8233	9233	-732	-1329	3706	-115	*	*										
196	-481	129	1690	121	445	161	266	779	-413	-723	-1527	-611	43	1798	-573	-332	-537	445	1105	-947
-	206	979	178	-352	-36	372	585	-635	438	-130	-677	-164	41	73	-335	-54	27	-12	-255	-97
-	-50	-8305	-5004	-732	-1329	-4093	-87	*	*											
197	-622	151	-623	1180	-864	-119	-243	-1463	-203	1185	-1504	1954	0	-395	-1163	8	-801	-222	-1083	-284
-	206	979	-178	352	-36	372	585	-635	438	-130	-677	-164	41	-73	-335	-54	27	-12	-255	-97
-	-7	-8262	-9262	-732	-1329	-3842	-104	*	*											
198	-645	129	-721	197	-886	-266	-266	1468	-413	-350	-1527	1850	-412	-923	-573	-905	198	-453	1620	-947
-	206	979	-178	-352	-36	372	585	-635	438	-130	-677	-164	41	-73	-335	-54	27	-12	-255	-97
-	-7	-8305	-9305	-732	-1329	-4093	-87	*	*											
199	187	129	-302	-317	-310	29	2616	-686	1606	-981	-1527	-1015	-407	-285	-334	-594	-824	-341	-1105	-801
-	206	979	-178	-352	-36	372	585	-635	438	-130	-677	-164	41	-73	-335	-54	27	-12	-255	-97
-	-7	-8305	-9305	-732	-1329	-3712	-115	*	*											
200	-515	96	-560	383	-920	80	206	-1519	-171	-756	1103	-133	-446	1935	-727	-938	1363	-630	-1139	-980
-	206	979	-178	-352	-36	372	585	-635	438	-130	-677	-164	41	-73	-335	-54	27	-12	-255	-97
-	-7	-8368	-9368	-732	-1329	-4067	-89	*	*											
201	1173	96	1062	-1236	-920	-341	-299	-302	-446	-159	-272	-391	144	-500	-1219	1598	-507	-341	-1139	-980
-	206	979	-178	-352	-36	372	585	-635	438	-130	-677	-164	41	-73	-335	-54	27	-12	-255	-97
-	-30	-8368	-5809	-732	-1329	-4067	-89	*	*											
202	1185	108	-502	-862	-907	-499	47	-813	1586	-1001	-1548	-1035	806	42	-365	-403	-65	-188	-1126	-968
-	206	979	-178	-352	-36	372	585	-635	438	-130	-677	-164	41	-73	-335	-54	27	-12	-255	-97
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203	162	108	2497	-1223	-907	-287	-286	-1506	73	-1001	-259	-631	-830	286	-1087	-452	33	-83	-1126	-968
-	206	979	-178	-352	-36	372	585	-635	438	-130	-677	-164	41	-73	-335	-54	27	12	255	-97
-	-408	-8344	-2039	-732	-1329	-4077	-88	*	*											
204	-77	308	-227	138	-707	-299	-86	-1306	-233	-553	471	597	-630	-77	1947	359	644	683	926	768
	206	979	-178	-352	-36	372	585	-635	438	-130	-677	-164	41	-73	-335	-54	27	12	255	97
-	-9	-7941	-8941	-732	-1329	-4214	-80	*	*											
205	-14	814	849	1644	-298	-299	326	-1306	-233	103	19	20	183	-326	-577	116	-498	683	926	768
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	-34	-7941	-5705	-732	-1329	-4001	-93	*	*											
206	-473	300	-311	-140	-715	1665	-94	-658	-23	-411	-392	-57	943	-752	-304	-733	188	-691	-934	-776
-	206	979	-178	-352	-36	372	585	-635	438	-130	-677	-164	41	-73	-335	-54	27	-12	-255	-97
-	-9	-7958	-8958	-732	-1329	-4209	-80	*	*											
207	287	300	-575	-471	-627	-93	-94	-658	-211	-589	11	-843	2174	-752	227	-259	-652	29	-934	-776
-	206	979	-178	-352	-36	372	585	-635	438	-130	-677	-164	41	-73	-335	-54	27	-12	-255	-97
-	-9	-7958	-8958	-732	-1329	-4209	-80	*	*											
208	-473	300	-857	1031	-715	74	613	-1314	-241	-386	-1355	-413	351	392	-142	335	1854	-153	-934	-776
-	206	979	-177	-352	-36	372	585	-635	438	-130	-677	-164	41	-73	-335	-54	27	-12	-255	-97
-	-2179	-364	-8958	-121	-3632	-4209	-80	*	*											
209	-473	714	55	-382	-715	20	3043	-608	-241	-157	-392	-843	439	-103	-410	-563	127	-691	-934	-776
-	206	979	-178	-352	-36	372	585	-635	438	-130	-677	-164	41	-73	-335	-54	27	-12	-255	-97
-	-9	-7958	-8958	-732	-1329	-4209	-80	*	*											
210	94	633	-419	1031	-715	-307	856	553	102	1286	-1355	-361	-133	-643	-1014	-341	-217	-282	-934	-776
-	206	979	-178	-352	-36	372	585	-635	438	-130	-677	-164	41	-73	-335	-54	27	-12	-255	-97
-	-28	-7958	-6050	-732	-1329	-4209	-80	*	*											
211	-464	1005	-774	1596	-706	308	1409	-1305	106	-425	-1347	-401	-277	557	-393	-724	-571	-252	-925	190
-	206	979	-178	-352	-36	372	585	-635	438	-130	-677	-164	41	-73	-335	-54	27	-12	-255	-97
-	-68	-7940	-4566	-732	-1329	-4102	-87	*	*											
212	-54	327	-264	-235	-688	-280	-67	-469	-214	-741	-22	-118	-66	-725	-562	1740	421	-664	-907	-749

-	207	979	-179	352	-36	372	585	-635	438	-130	-677	-164	40	73	-335	-54	27	12	255	-97
-	2121	-381	-8901	-127	3572	-4133	-85	*	*											
213	6	3381	-838	-341	-696	110	429	-200	10	-628	-1336	-207	790	309	-995	-322	-633	229	915	756
	206	979	-178	352	-36	372	585	-635	438	-130	-677	-164	41	-73	-335	-54	27	12	255	97
-	-37	-7917	-5565	-732	1329	-3848	-104	*	*											
214	128	805	-437	-117	-719	247	-98	-1319	653	-637	-1360	-444	1907	-756	-526	-247	31	74	938	780
-	206	979	178	-352	-36	372	585	-635	438	-130	-677	-164	41	-73	-335	-54	27	-12	-255	-97
-	-54	-7967	-4931	-732	-1329	-4206	-80	*	*											
215	-241	317	-841	-1014	-698	-290	-77	-589	-225	1258	-211	-827	376	624	-513	476	164	-675	-917	-759
-	206	979	-178	-352	-36	372	585	-635	438	-130	-677	-164	41	-73	-335	-54	27	-12	-255	-97
-	-9	-7922	-8922	-732	-1329	-4220	-80	*	*											
216	-103	890	-841	-1014	-364	-290	396	-1298	-225	15	-1339	2065	465	-735	-386	-36	287	-542	-917	-140
	206	979	-178	-352	-36	372	585	-635	438	-130	-677	-164	41	-73	-335	-54	27	-12	-255	-97
-	-9	-7922	-8922	-732	-1329	-4220	-80	*	*											
217	-456	698	-463	-1014	-698	-290	1171	-791	577	1232	-1339	284	826	-735	-997	-480	-69	-675	-917	-759
-	206	979	-178	-352	-36	372	585	-635	438	-130	-677	-164	41	-73	-335	-54	27	-12	-255	-97
-	-9	-7922	-8922	-732	-1329	-4220	-80	*	*											
218	135	317	-841	-1014	-202	-290	457	-1298	380	-20	-374	-330	2124	322	-568	-239	-130	-675	-917	-759
	206	979	-178	-352	-36	372	585	-635	438	-130	-677	-164	41	-73	-335	-54	27	-12	-255	-97
-	-9	-7922	-8922	-732	-1329	-4220	-80	*	*											
219	-209	317	-841	-1014	-698	-290	-77	-1203	120	1259	-1339	-40	53	332	-242	-240	620	-259	-917	-204
-	206	979	-178	-352	-36	372	585	-635	438	-130	-677	-164	41	-73	-335	-54	27	-12	-255	-97
-	-9	-7922	-8922	-732	-1329	-4087	-88	*	*											
220	295	1356	-852	-1026	-376	-302	482	-1309	560	-37	-1350	-37	-564	2178	-253	-532	132	-25	-929	-771
	206	979	-178	-352	-36	372	585	-635	438	-130	-677	-164	41	-73	-335	-54	27	-12	-255	-97
-	-9	-7947	-8947	-732	-1329	-4003	-93	*	*											
221	243	286	-871	250	-233	-321	1424	-1328	-39	-304	-1369	2037	-327	-74	-551	-440	-666	-184	948	-790
-	206	979	-178	-352	-36	372	585	-635	438	-130	-677	-164	41	-73	-335	-54	27	-12	-255	-97
-	-9	-7987	-8987	-732	-1329	-4199	-81	*	*											
222	487	286	-565	-682	-729	77	-108	-1024	-211	100	-1369	2037	130	632	179	-448	-144	-296	-948	-790
	206	979	-178	-352	-36	372	587	-635	438	-130	-676	-164	41	-73	-335	-54	27	-12	-255	-97
-	-2387	-310	-8987	-118	-3672	-4055	-89	*	*											
223	479	285	-384	-617	-234	-322	398	-1329	526	-499	-1370	-530	-653	-177	-222	-356	1809	-185	-949	-335
	206	979	-176	-352	-36	372	585	-635	438	-130	-677	-164	41	-73	-335	-54	27	-12	-255	-97
	-9	-7989	-8989	-732	-1329	-3972	-95	*	*											
224	1607	265	-354	-178	-750	214	1326	-1350	-15	-668	-1391	-446	-674	342	-294	-371	2	-444	-969	-811
-	206	979	-178	-352	-36	372	585	-635	438	-130	-677	-164	41	-73	-335	-54	27	-12	-255	-97
-	-48	-8032	-5102	-732	-1329	-4072	-88	*	*											
225	1618	275	-883	-39	-112	-174	-120	-745	-5	-210	-1381	-232	-312	290	-308	-208	-366	-274	-960	-801
-	206	979	-178	-352	-36	372	585	-635	438	-130	-677	-164	41	-73	-335	-54	27	-12	-255	-97
-	-8	-8012	-9012	-732	-1329	-4057	-89	*	*											
226	164	362	747	1509	-752	-2	606	-1351	-46	-846	-1392	-552	-390	-789	-401	-566	479	-62	-971	-181
-	206	979	-178	-352	-36	372	585	-635	438	-130	-677	-164	41	-73	-335	-54	27	-12	-255	-97
-	-61	-8035	4738	-732	-1329	-3970	-95	*	*											
227	62	269	20	-1062	-746	268	649	1687	-41	-840	-1387	-874	-669	-783	-960	121	536	-91	951	-807
-	206	979	-178	-352	-36	372	585	-635	438	-130	-677	-164	41	-73	-335	-54	27	-12	-255	-97
-	-560	-8022	-1653	-732	-1329	-2894	-208	*	*											
228	364	309	-218	-661	-706	-59	1082	-1305	-1	-317	-381	-433	259	-401	-660	-99	-643	95	-925	2192
-	206	979	-178	-352	-36	372	585	-635	438	-130	-677	-164	41	-73	-335	-54	27	-12	-255	-97
-	-9	-7929	-8929	-732	-1329	-4207	-80	*	*											

229	25	309	-365	744	-706	328	476	-1305	-232	1150	54	-834	-119	-743	-108	385	186	-682	925	-211
	206	979	178	352	36	372	585	-635	438	-130	677	-164	41	-73	-335	54	27	12	255	-97
-	-103	-7929	-3947	732	1329	-3938	-97	*	*											
230	-44	326	-24	-1005	-689	333	-68	-1289	50	-564	-570	141	356	-91	-988	1535	151	-406	-908	-750
-	206	979	-178	-352	-36	372	585	-635	438	-130	-677	-164	41	-73	-335	-54	27	-12	-255	-97
-	-9	-7892	-8892	-732	-1329	-4217	-80	*	*											
231	-408	326	-294	-482	-689	558	-68	-570	275	-51	-583	-422	1979	-223	-988	-88	-318	-665	-908	-750
-	206	979	-178	-352	-36	372	585	-635	438	-130	-677	-164	41	-73	-335	-54	27	-12	-255	-97
-	-58	-7892	-4839	-732	-1329	-4217	-80	*	*											
232	-425	348	-737	-984	-667	138	-46	-1267	298	-49	338	-796	-238	245	-237	-387	-296	1661	-886	464
-	206	979	-178	-352	-36	372	585	-635	438	-130	-677	-164	41	-73	-335	-54	27	-12	-255	-97
-	-39	-7844	-5500	-732	-1329	-3817	-106	*	*											
233	-455	1038	-492	-1013	-697	-50	-76	-1297	552	-123	-1338	-826	-553	-98	1853	574	-12	-390	-916	-758
-	206	979	-178	-352	-36	372	585	-635	438	-130	-677	-164	41	-73	-335	-54	27	-12	-255	-97
-	-95	-7912	-4068	-732	-1329	-4214	-80	*	*											
234	-96	357	-425	-975	-658	277	676	-1258	-185	-585	-1299	-787	1215	-11	-179	1405	-248	-353	-877	-719
-	206	979	-178	-352	-36	372	585	-635	438	-130	-677	-164	41	-73	-335	-54	27	-12	-255	-97
-	-10	-7826	-8826	-732	-1329	-3868	-102	*	*											
235	-254	322	133	-1010	-693	-285	-72	-550	435	-440	432	130	1892	-730	104	-43	-83	-670	-912	-754
-	206	979	-178	-352	-36	372	585	-635	438	-130	-677	-164	41	-73	-335	-54	27	-12	-255	-97
-	-9	-7901	-8901	-732	-1329	-4213	-80	*	*											
236	-110	322	-836	-1010	-693	-285	-72	-757	1675	-705	90	-342	277	-282	669	291	-382	106	-912	-754
-	206	979	-178	-352	-36	372	585	-635	438	-130	-677	-164	41	-73	-335	-54	27	-12	-255	-97
-	-9	-7901	-8901	-732	-1329	-3832	-105	*	*											
237	-489	284	-874	-1047	-731	-129	273	-514	1871	-826	-1372	-860	832	144	-405	-354	849	345	-950	-792
-	206	979	-178	-352	-36	372	585	-635	438	-130	-677	-164	41	-73	-335	-54	27	-12	255	-97
-	-9	-7983	-8983	-732	-1329	-4189	-81	*	*											
238	-275	284	-451	-1047	-731	447	-110	-219	1738	-607	-1372	-860	1104	-335	-685	-194	246	708	950	-792
-	206	979	-178	-352	-36	372	585	-635	438	-130	-677	-164	41	-73	-335	-54	27	12	255	-97
-	33	-7983	-5767	-732	-1329	-4189	-81	*	*											
239	-235	768	-863	-578	-720	1405	618	-793	680	-333	-1361	-420	-247	-740	-145	832	-657	-469	-939	-781
-	206	979	-178	-352	-36	372	585	-635	438	-130	-677	-164	41	-73	-335	-54	27	-12	-255	-97
-	-9	-7960	-8960	-732	-1329	-4198	-81	*	*											
240	-264	295	-863	-1036	-720	-100	551	-414	200	28	-1361	-500	228	130	50	1348	-165	135	-939	-781
-	206	979	-178	-352	-36	372	585	-635	438	-130	-677	-164	41	-73	-335	-54	27	-12	-255	-97
	-9	-7960	-8960	-732	-1329	-4198	-81	*	*											
241	136	396	-863	-678	-93	160	606	-857	567	-814	-451	-848	183	-541	-407	-94	1844	-696	-939	-781
-	206	979	-178	-352	-36	372	585	-635	438	-130	-677	-164	41	-73	-335	-54	27	-12	-255	-97
-	-30	-7960	-5897	-732	-1329	-3932	-98	*	*											
242	322	281	-877	-537	-107	237	632	-629	-209	-205	-1375	-756	-257	-771	-717	73	1861	-447	-953	-795
-	206	979	-178	-352	-36	372	585	-635	438	-130	-677	-164	41	-73	-335	-54	27	-12	-255	-97
-	-20	-7991	-6679	-732	-1329	-4191	-81	*	*											
243	-60	286	-93	-1045	383	-321	-108	-1328	87	-8	-284	-857	-653	-316	1666	734	-160	-368	-948	-790
-	206	979	-178	-352	-36	372	585	-635	438	-130	-677	-164	41	-73	-335	-54	27	-12	-255	-97
-	-37	-7980	-5572	-732	-1329	-4125	-85	*	*											
244	40	1010	-435	-1038	-721	-313	401	-1321	96	-240	-1362	-500	306	-758	-593	-491	-32	1549	-940	1285
-	206	979	-178	-352	-36	372	585	-635	438	-130	-677	-164	41	-73	-335	-54	27	-12	-255	-97
-	-12	-7964	-7849	-732	-1329	-4178	-82	*	*											
245	206	294	-864	-678	-721	-265	1122	-653	311	-225	-1362	1738	-645	-758	474	206	-82	-302	-940	-782
-	206	979	-178	-352	-36	372	585	-635	438	-130	-677	-164	41	-73	-335	-54	27	-12	-255	-97

-	-9	-7965	8965	-732	-1329	-4205	-80	*	*										
246	479	294	-819	-277	-44	313	23	-1320	407	288	-1362	-416	645	520	221	1419	14	697	940	174
-	206	979	-178	352	-36	372	585	-635	438	-130	-677	-164	41	73	335	-54	27	-12	-255	-97
-	-40	-7965	-5426	732	1329	-4045	-90	*	*											
247	194	295	-862	1036	318	-312	-99	-1319	271	-814	-1360	-848	-561	-112	-98	215	1821	88	-939	398
-	206	979	-178	-352	-36	372	585	-635	438	-130	-677	-164	41	-73	-335	-54	27	12	-255	-97
-	-9	-7961	-8961	-732	-1329	-4149	-84	*	*											
248	1429	294	-864	-1037	202	-31	293	-1321	-247	-560	-1362	-103	-645	77	-358	197	-348	-375	-940	1457
-	206	979	178	-352	-36	372	585	-635	438	-130	-677	-164	41	-73	-335	-54	27	-12	-255	-97
-	-9	-7963	-8963	-732	-1329	-4200	-81	*	*											
249	-114	294	-864	-1037	-721	222	1147	-1204	649	-285	-1362	1796	435	-309	-4	-82	-207	-697	-940	-782
-	206	979	-178	-352	-36	372	585	-635	438	-130	-677	-164	41	-73	-335	-54	27	-12	-255	-97
-	-9	-7963	-8963	-732	-1329	-4200	-81	*	*											
250	1433	767	-864	-1037	-97	-266	-100	-1321	357	0	-1362	-419	-184	-758	-1020	95	877	-238	-940	-782
-	206	979	-178	-352	-36	372	585	-635	438	-130	-677	-164	41	-73	-335	-54	27	-12	-255	-97
-	-9	-7963	-8963	-732	-1329	-2995	-193	*	*											
251	815	137	-1020	1153	-878	-191	215	-810	887	-972	-1518	-1006	-801	-79	-1177	-575	-671	203	-1097	1612
-	206	979	-178	-352	-36	372	585	-635	438	-130	-677	-164	41	-73	-335	-54	27	-12	-255	-97
-	-7	-8283	-9283	-732	-1329	-3973	-95	*	*											
252	317	710	-1028	-623	-886	-266	508	-1466	299	-730	-1526	-1014	-809	-923	1126	424	1640	-862	-1105	316
-	206	979	-178	-352	-36	372	585	-635	438	-130	-677	-164	41	-73	-335	-54	27	-12	-255	-97
-	-7	-8298	-9298	-732	1329	-3917	-99	*	*											
253	-657	117	-611	-1215	-544	-116	1176	-831	-425	442	-1539	-706	-56	1898	-581	476	-53	103	-1117	-959
	206	979	-178	-352	-36	372	585	-635	438	-130	-677	-164	41	-73	-335	-54	27	-12	-255	-97
-	-7	-8322	-9322	-732	-1329	-3821	-106	*	*											
254	1692	100	-766	-320	-915	-507	-294	-980	-442	-119	-1556	-1044	-758	219	563	335	408	-794	1134	-976
-	206	979	-178	352	-36	372	585	-635	438	-130	-677	-164	41	-73	-335	-54	27	-12	-255	-97
-	-7	-8352	-9352	-732	-1329	-4052	-90	*	*											
255	347	100	-970	-893	-915	-183	-294	-1497	-12	425	-1556	107	-839	-435	-460	-281	1570	-383	-1134	1364
-	206	979	-178	-352	-36	372	585	-635	438	-130	-677	-164	41	-73	-335	-54	27	-12	-255	-97
-	-7	-8352	-9352	-732	-1329	-4052	-90	*	*											
256	128	100	-318	-711	-508	-182	795	-1515	-76	509	-1556	-1044	-839	-47	444	1464	-356	-440	-1134	-976
	206	979	178	-352	-36	372	585	-635	438	-130	-677	-164	41	-73	-335	-54	27	-12	-255	-97
-	-7	-8352	-9352	-732	-1329	-4052	-90	*	*											
257	1123	819	-68	-1232	-915	-507	-294	-1515	48	-124	-1556	-937	-379	-367	623	264	60	-172	2520	-976
-	206	979	-178	-352	-36	372	585	-635	438	-130	-677	-164	41	-73	-335	-54	27	-12	-255	-97
-	-7	-8352	-9352	-732	-1329	-4052	-90	*	*											
258	-322	816	-1058	-708	2096	-343	-294	-1515	-442	1051	-1556	-937	-164	-952	159	-461	122	-365	-1134	-976
-	206	979	-178	-352	-36	372	585	-635	438	-130	-677	-164	41	-73	-335	-54	27	-12	-255	-97
-	-7	-8352	-9352	-732	-1329	-4052	-90	*	*											
259	-40	1351	-1058	-874	1090	12	-294	-989	-442	30	-271	959	-510	1701	-136	-579	-88	-824	-1134	-976
-	206	979	-178	-352	-36	372	585	-635	438	-130	-677	-164	41	-73	-335	-54	27	-12	-255	-97
-	-48	-8352	-5060	-732	-1329	-4052	-90	*	*											
260	-603	122	507	-1209	-893	-485	-272	-692	-234	-78	-574	-1022	-731	-466	629	83	1926	-64	-1112	-337
-	206	979	-178	-352	-36	372	585	-635	438	-130	-677	-164	41	-73	-335	-54	27	-12	-255	-97
-	-82	-8310	-4254	-732	-1329	-4071	-89	*	*											
261	-410	161	-76	-1170	-854	-446	-233	-1453	1107	651	-1495	-581	-58	1766	-830	-89	-36	-416	-1073	-217
-	206	979	-178	-352	-36	372	585	-635	438	-130	-677	-164	41	-73	-335	-54	27	-12	-255	-97
-	-24	-8236	-6258	-732	-1329	-4104	-86	*	*											
262	-604	2587	-988	-826	-164	-437	-224	-790	1522	264	-525	-974	-683	250	-619	-416	97	146	-1064	-799

-	206	979	178	352	-36	372	585	-635	438	-130	-677	-164	41	-73	-335	-54	27	-12	-255	-97
-	-43	8220	5276	732	-1329	-3896	-100	*	*											
263	604	1340	337	626	-845	-437	154	-781	48	-544	520	-105	1587	-165	-1144	-608	-783	503	-1064	1124
-	206	979	-178	-352	-36	372	585	-635	438	-130	-677	-164	41	-73	-335	-54	27	-12	-255	-97
-	-7	-8221	-9221	-732	-1329	-3642	-120	*	*											
264	-329	1155	-447	-786	-398	-477	450	-1484	305	1018	-764	144	-388	-399	806	-561	-534	-6	-1104	670
-	206	979	178	-352	-36	372	585	-635	438	-130	-677	-164	41	-73	-335	-54	27	-12	-255	-97
-	-32	-8295	-5753	-732	-1329	-3930	-98	*	*											
265	-439	134	-1023	-683	-881	-473	-260	-509	1866	869	-1522	-1009	-742	-33	220	141	-818	-441	-1100	-942
-	206	979	178	-352	-36	372	585	-635	438	-130	-677	-164	41	-73	-335	-54	27	-12	-255	-97
-	-7	-8287	-9287	-732	-1329	-4077	-88	*	*											
266	134	713	-188	-674	-257	-164	-260	-475	10	717	-1522	90	703	-702	-1180	1068	-818	-575	-1100	-942
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-	-90	-8287	-4132	-732	-1329	-4077	-88	*	*											
267	-113	177	-60	-1154	25	333	-217	-1438	193	-769	-114	-967	-434	-228	-478	704	1655	-165	-1057	-346
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-	-7	-8204	-9204	-732	-1329	-3569	-127	*	*											
268	-306	126	-596	1018	148	-481	-268	-1488	224	-823	-1530	-1017	-812	-715	-6	1143	250	647	-1108	-21
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269	-652	121	-1036	-279	1366	-275	1934	-1059	295	470	-1534	-354	-552	-931	178	271	232	-542	-1113	-954
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	-43	-8311	-5252	-732	-1329	-4065	-89	*	*											
270	-418	140	-1017	-1191	-875	290	912	-579	85	-52	-1515	22	967	-491	611	373	1074	-851	-1094	-935
-	206	979	-178	-352	-36	372	585	-635	438	-130	-677	-164	41	-73	-335	-54	27	-12	-255	-97
	-108	-8275	-3858	-732	-1329	-3846	-104	*	*											
271	-601	1342	-985	817	-843	-435	-222	-595	-139	96	-1483	-971	-766	-880	744	298	440	853	-1062	-351
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-	-196	-8212	3016	-732	-1329	-3619	-123	*	*											
272	-555	219	275	-229	1084	-389	745	-1396	768	1197	-1437	-925	-720	-746	-562	-418	-734	-562	-1016	207
-	206	979	-178	-352	-36	372	585	-635	438	-130	-677	-164	41	-73	-335	-54	27	-12	-255	-97
-	-8	-8119	-9119	-732	-1329	-4135	-85	*	*											
273	-24	219	-939	676	-51	-389	206	542	-93	692	-1437	-307	-720	-419	507	-409	-386	-773	-1016	593
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274	-199	1740	-927	831	-285	-377	2043	-548	983	274	-1426	-913	-708	-822	502	-242	-722	-345	1431	-292
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275	-65	250	-907	-1081	1463	-357	-144	1214	1192	-325	-1405	-465	-688	-802	120	-783	137	-741	-984	-826
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-	206	979	-178	-352	-36	372	585	-635	438	-130	-677	-164	41	-73	-335	-54	27	-12	-255	-97
-	-39	-7872	-5476	-732	-1329	-4223	-79	*	*											
277	-424	349	-809	-941	447	-258	-45	-171	300	358	-1307	-794	-590	-56	937	-486	-604	-359	3009	75
-	206	979	-178	-352	-36	372	585	-635	438	-130	-677	-164	41	-73	-335	-54	27	-12	-255	-97
-	-9	-7843	-8843	-732	-1329	-4233	-79	*	*											
278	-424	853	406	-31	-666	-258	-45	124	1048	-513	-1307	-794	-590	-703	-227	-460	1197	-642	1435	-171
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279	-287	1126	807	-622	448	-257	-44	157	161	981	-1306	-793	-588	-702	-60	-683	413	464	-884	-726
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-	-9	-7841	8841	-732	-1329	4235	79	*	*											
280	-82	1521	-807	-457	1554	-257	-44	-1264	78	-539	-1306	60	-588	-702	-539	401	237	-215	-884	1286
-	206	979	178	-352	-36	372	585	-635	438	-130	-677	-164	41	-73	-335	-54	27	-12	-255	-97
-	-146	-7841	-3446	732	-1329	-4235	79	*	*											
281	26	409	-748	-71	736	-40	1497	-1205	-132	502	-1246	-734	-529	1604	-905	-624	-294	-582	-825	91
-	206	979	178	-352	-36	372	585	-635	438	-130	-677	-164	41	-73	-335	-54	27	-12	-255	-97
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284	342	1602	384	-391	-665	-234	-44	-416	-18	1018	-1306	-793	-588	-702	-60	-55	458	-641	266	-726
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-	-55	-7841	-4919	-732	-1329	-4235	-79	*	*											
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	206	979	-178	352	-36	372	585	-635	438	-130	-677	-164	41	-73	-335	-54	27	12	255	97
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	206	979	178	-352	-36	372	585	-635	438	-130	-677	-164	41	-73	-335	-54	27	-12	-255	-97
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-	-36	-7841	-5601	-732	-1329	-4235	-79	*	*											
292	-81	1020	225	-678	742	-245	1216	-761	195	98	647	-781	-576	-45	1178	-428	-579	-629	-872	-714
-	206	979	-178	-352	-36	372	585	-635	438	-130	-677	-164	41	-73	-335	-54	27	-12	-255	-97
-	-10	-7815	8815	-732	-1329	-4243	-78	*	*											
293	-254	362	1241	357	-91	-245	-32	-1160	1093	130	-1294	-781	-576	-42	-469	-490	-138	-345	351	-714
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-	-80	-7815	-4336	-732	-1329	-4108	-86	*	*											
294	-393	381	749	-220	719	-227	-14	-879	-106	362	-1275	-763	-558	143	1352	-283	-262	-611	-853	-695
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-	-38	-7775	-5552	-732	-1329	-4090	-87	*	*											
295	-396	377	435	-592	-638	-230	2599	-530	-164	-220	-613	-766	-561	468	414	262	-575	-291	-857	-178
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-	-2035	-408	-8841	-177	-3111	-2838	-217	*	*											
298	-242	2365	-275	-374	-732	-324	629	1530	-258	-60	-1372	-378	-655	299	-1031	-750	202	-293	-950	-792
-	206	979	-178	-352	-36	372	585	-635	438	-130	-677	-164	41	-73	-335	-54	27	-12	-255	-97
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299	91	250	-907	563	-140	-357	-144	-1364	74	187	2654	-893	-159	-281	-580	-783	339	-741	-984	-38
-	206	979	-178	-352	-36	372	585	-635	438	-130	-677	-164	41	-73	-335	-54	27	-12	-255	-97
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300	-276	250	-818	321	523	-41	363	-1364	52	530	2654	-893	-688	-351	-665	-484	-115	-741	-984	-826
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302	93	1430	-899	-74	-756	-348	277	333	97	-602	981	-884	-680	-793	170	1414	-694	-732	-975	-295
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303	52	259	-899	-1072	-78	-348	346	-1355	749	-525	3252	-481	-596	-125	-1055	-530	-443	-402	259	-262
-	206	979	-178	-352	-36	372	585	-635	438	-130	-677	-164	41	-73	-335	-54	27	-12	-255	-97
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-	206	979	-178	-352	-36	372	585	-635	438	-130	-677	-164	41	-73	-335	-54	27	-12	-255	-97
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-	206	979	-178	-352	-36	372	585	-635	438	-130	-677	-164	41	-73	-335	-54	27	-12	-255	-97
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-	206	979	-178	-352	-36	372	585	-635	438	-130	-677	-164	41	-73	335	-54	27	-12	-255	-97
-	-8	-8044	-9044	-732	1329	4183	-82	*	*											
313	-514	1770	1726	538	357	-348	-135	-640	-282	-512	-335	-884	-680	57	-109	-774	-165	-58	-975	-817
-	206	979	-178	-352	-36	372	585	-635	438	-130	-677	-164	41	-73	-335	-54	27	-12	-255	-97
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314	260	824	-899	-66	-756	-348	1523	-378	-282	1040	-1397	-396	-680	1077	-163	-774	-403	-732	-975	-257
-	206	979	-178	-352	-36	372	585	-635	438	-130	-677	-164	41	-73	-335	-54	27	-12	-255	-97
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-	-8	-8044	-9044	-732	-1329	-4183	-82	*	*											
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-	206	979	-178	-352	-36	372	585	-635	438	-130	-677	-164	41	-73	-335	-54	27	-12	-255	-97
-	-8	-8044	-9044	-732	-1329	-4183	-82	*	*											
318	-514	259	-899	-118	-252	-108	-135	1591	373	242	981	-481	-680	461	-626	-509	-694	-732	-975	-29
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-	-8	-8044	-9044	-732	-1329	-4183	-82	*	*											
319	260	259	-517	-188	115	-348	-135	1852	62	-512	1419	-884	-680	-793	-656	-39	-694	-732	-975	-817
-	206	979	-178	-352	-36	372	585	-635	438	-130	-677	-164	41	-73	-335	-54	27	-12	-255	-97
-	-8	-8044	-9044	-732	-1329	-4183	-82	*	*											
320	-514	824	-899	-1072	-756	-348	338	-261	982	-525	1538	-387	-680	-793	-146	-774	-694	1460	-975	775
-	206	979	-178	-352	-36	372	585	-635	438	-130	-677	-164	41	-73	-335	-54	27	12	-255	97
-	-8	-8044	-9044	-732	-1329	-4183	-82	*	*											
321	-514	977	662	-548	-756	-136	373	-1355	428	-850	1057	-884	-680	-793	438	-774	1614	236	975	817
-	206	979	-178	-352	-36	372	585	-635	438	-130	-677	-164	41	-73	-335	-54	27	12	-255	-97
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322	1450	1242	-332	-1072	-756	-348	778	-890	322	-629	-1397	216	-680	-793	638	-349	347	-413	-975	-817
-	206	979	-178	-352	-36	372	585	-635	438	-130	-677	-164	41	-73	-335	-54	27	-12	-255	-97
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323	-514	765	-517	-1072	-756	-348	1759	-887	695	-525	-1171	-884	-680	847	-422	43	-694	-732	-975	2435
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324	-877	621	-878	-265	-1118	-710	322	2057	1370	-50	-943	-762	-106	-694	-752	-1136	-1056	-1095	-1337	465
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325	-877	-103	1943	-1435	-1118	-395	-497	-913	-299	-867	3274	-576	-1042	251	-399	-1136	-1056	-541	-1337	-720
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-	-5	-8719	-9719	-732	-1329	-3892	-101	*	*											
326	-262	-103	-383	-1435	-1118	-538	-497	-1718	-411	806	3316	-220	-526	861	-88	-1136	-1056	-678	-1337	-1179
-	206	979	-178	-352	-36	372	585	-635	438	-130	-677	-164	41	-73	-335	-54	27	-12	-255	-97
-	-5	-8719	-9719	-732	-1329	-3892	-101	*	*											
327	-556	3840	-1261	-908	-1118	-710	-497	-576	-645	-264	-776	246	1548	278	-1417	-219	-1056	-1095	-1337	-1179
-	206	979	-178	-352	-36	372	585	-635	438	-130	-677	-164	41	-73	-335	-54	27	-12	-255	-97
-	-5	-8719	-9719	-732	-1329	-3892	-101	*	*											
328	-877	1007	-1261	-1435	235	-710	2477	-479	-301	-121	-1759	-1247	-172	-454	-938	1933	-1056	-676	-1337	-1179
-	206	979	-178	-352	-36	372	585	-635	438	-130	-677	-164	41	-73	-335	-54	27	-12	-255	-97
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329	1095	485	881	1435	152	-710	751	-1718	-456	-369	3445	-1247	-1042	737	-1417	-865	-1056	-678	1337	-1179
	206	979	178	352	-36	372	585	635	438	-130	-677	-164	41	-73	-335	54	27	12	255	97
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330	-310	2195	1261	-1435	-1118	-710	-497	-1718	-381	-992	66	396	-1042	-1155	-1417	-743	-1056	1352	1337	2915
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332	-877	-103	-1261	1065	94	-493	278	2259	-645	-886	618	-893	-1042	-1155	-326	-184	-1056	-552	-1337	-534
-	206	979	-178	-352	-36	372	585	-635	438	-130	-677	-164	41	-73	-335	-54	27	-12	-255	-97
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333	683	3793	-1270	920	-629	-468	662	-965	-420	-1221	-407	-1255	-1051	-1164	-97	-410	1302	-408	-1346	909
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334	-885	1601	-960	-1443	1705	-719	-506	23	2150	-895	-1768	-1255	-1051	-1164	-1426	-844	-1065	603	-1346	176
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-	-5	-8734	-9734	-732	-1329	-3883	-101	*	*											
335	-383	-112	-1270	-1443	-1127	-163	-506	-856	1418	-479	636	-1255	-1051	-1164	-761	-1145	-610	1973	-1346	1105
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-	-5	-8734	-9734	-732	-1329	-3883	-101	*	*											
336	-98	366	-1270	-1443	-500	-719	-506	-742	2188	-597	-689	-1255	-1051	-1164	1820	-416	-1065	-576	-1346	-566
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337	-885	646	-1270	-1443	-768	-719	-506	-1726	905	-1221	-1768	2397	-1051	-738	-542	-207	136	1327	-1346	-1188
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338	-668	477	-1270	-625	-1127	-719	-506	2094	-140	878	-1768	-816	-1051	224	-810	-410	-1065	395	-1346	-1188
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-	-5	-8734	-9734	-732	-1329	-3883	-101	*	*											
339	-784	-112	2188	-306	-1127	-719	215	1424	-438	-250	-1768	-764	100	-637	-1426	-1145	-7	-771	-1346	-629
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-	-5	-8734	-9734	-732	-1329	-3883	-101	*	*											
340	-885	-112	-883	-264	-1127	-719	-506	-1343	1825	1701	-1768	-1255	-652	224	-1029	-1145	-1065	-685	-1346	-1188
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341	-80	-112	-889	1519	-1127	-402	-506	-1726	2222	-996	-1768	23	-1051	-1164	-334	-322	-1065	-873	-1346	-1188
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-	-5	-8734	-9734	-732	-1329	-3883	-101	*	*											
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343	-710	-112	41	1413	-681	-719	-506	-1057	2177	-1221	-689	-771	-433	-1164	-232	-199	-750	-1103	-1346	-402
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-	-5	-8734	-9734	-732	-1329	-3883	-101	*	*											
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	-5	-8734	9734	-732	-1329	3883	-101	*	*										
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347	-565	-112	-151	-370	234	-719	-506	1283	-289	-724	-1768	57	-1051	1843	-97	-1145	1149	-813	-1346	-1188
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350	-488	112	-1270	-1443	1981	-719	-506	-1726	1690	-435	-1768	-752	-1051	-1164	1604	-1145	-224	-419	-1346	-621
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351	-501	867	1387	-1258	96	-534	-321	-121	131	-787	-1583	-1071	-353	-466	-1241	-289	-460	234	-1161	2390
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352	-365	73	-701	-492	-942	-534	-321	-1019	515	769	-1583	1859	-350	-610	-814	-960	-880	-919	-1161	1808
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353	-215	73	-1085	-965	-942	230	-321	-1542	-424	-813	-1583	-44	1514	-979	755	1210	-386	262	-1161	-186
-	206	979	-178	-352	-36	372	585	-635	438	-130	-677	-164	41	-73	-335	-54	27	-12	-255	-97
-	-199	8409	-2991	-732	-1329	-4050	-90	*	*											
354	277	174	-983	-424	-215	173	1614	-720	669	-715	-1481	208	-407	-454	-655	-859	437	1436	-1060	-901
-	206	979	178	352	-36	372	585	-635	438	-130	-677	-164	41	-73	-335	-54	27	-12	-255	-97
-	-154	-8216	3349	-732	-1329	-4126	-85	*	*											
355	-273	723	-627	-549	2123	-261	362	-901	51	-862	-1408	-896	-691	957	799	-396	-705	-23	-986	18
-	206	979	-178	-352	-36	372	585	-635	438	-130	-677	-164	41	-73	-335	-54	27	-12	-255	-97
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356	308	248	-910	-1084	-767	-359	-146	-1367	267	-523	2725	-896	1002	87	264	-396	-705	315	-986	435
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357	526	831	-910	-723	-139	-15	-146	-702	361	-862	-1408	444	-31	2484	-719	-785	-559	157	-986	-209
-	206	979	-178	-352	-36	372	585	-635	438	-130	-677	-164	41	-73	-335	-54	27	-12	-255	-97
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358	510	248	-485	-454	-767	199	234	-1367	-22	-535	-1408	-509	-691	-349	1850	568	-705	-515	-986	-44
-	206	979	-178	-352	-36	372	585	-635	438	-130	-677	-164	41	-73	-335	-54	27	-12	-255	-97
-	-124	-8068	3669	-732	-1329	-1826	-478	*	*											
359	-753	-144	-1302	-815	-45	-751	-538	-1091	-686	741	-1800	-324	-665	-1196	-53	-875	2370	108	-1378	-1220
-	206	979	-178	-352	-36	372	585	-635	438	-130	-677	-164	41	-73	-335	-54	27	-12	-255	-97
-	-5	-8788	9788	-732	-1329	-3847	-104	*	*											
360	-193	-144	-1302	-1050	2824	-435	-538	-955	1494	-1254	-1800	-572	-1083	-1196	-1458	-19	-777	-414	-1378	-659
-	206	979	-178	-352	-36	372	585	-635	438	-130	-677	-164	41	-73	-335	-54	27	-12	-255	-97
-	-5	-8788	-9788	-732	-1329	-3847	-104	*	*											
361	-917	-144	-920	-1061	-710	-751	561	-1233	2455	-288	-1800	-1288	-1083	-9	-1458	-294	1271	-799	-1378	-1220
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-	-5	-8788	-9788	-732	-1329	-3847	-104	*	*											
362	-917	-144	-1302	-709	-137	-751	-538	-1088	127	-1254	-1800	1525	-1083	-1196	2456	31	-739	150	-1378	-1220

-	206	979	-178	-352	-36	372	585	-635	438	-130	-677	-164	41	-73	-335	54	27	-12	-255	-97
-	-5	8788	-9788	-732	-1329	3847	104	*	*											
363	-566	-144	1302	-1179	142	-751	-538	1378	-686	-1209	-1800	1288	-1083	-1196	-542	-573	-611	2172	-1378	1135
-	206	979	-178	-352	-36	372	585	-635	438	-130	-677	-164	41	-73	-335	-54	27	-12	-255	-97
-	-5	-8788	-9788	-732	-1329	-3847	-104	*	*											
364	-350	-144	-310	-1179	-491	-751	181	-1289	-686	2216	-1800	-1288	-1083	-1196	67	-537	-1097	-843	-1378	-232
-	206	979	-178	-352	-36	372	585	-635	438	-130	-677	-164	41	-73	-335	-54	27	-12	-255	-97
-	-29	-8788	-5833	-732	-1329	-3847	-104	*	*											
365	-903	-130	-1287	-787	-1145	-737	-524	2379	-2	-98	-1785	-787	-1068	1699	-1444	-223	-1082	-484	-1364	-743
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366	-903	-130	-976	-1461	-704	-257	-156	-1264	2446	-988	-1785	-1273	-1068	-1182	-646	-427	-1082	9	-1364	2188
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367	1021	-130	-690	2197	-736	-737	-524	-708	-431	-282	-1785	-172	-1068	-1182	-1444	-727	-1082	-431	-1364	320
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-	-5	-8765	-9765	-732	-1329	-3863	-103	*	*											
368	-288	-130	-364	2230	-651	-483	-524	-189	-671	-234	-1785	-838	-1068	-665	-1040	1007	-1082	-1121	-1364	-1206
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-	-5	-8765	-9765	-732	-1329	-3863	-103	*	*											
369	-552	-130	-1287	2230	-1145	-539	-524	-786	328	-662	-715	-865	-132	-1182	-1444	-628	1385	-1121	-1364	-1206
-	206	979	-178	-352	-36	372	585	-635	438	-130	-677	-164	41	-73	-335	-54	27	-12	-255	-97
-	-5	-8765	-9765	-732	-1329	-3863	-103	*	*											
370	-903	-130	-1287	-543	-516	-372	-45	-1744	-671	-1239	-1785	-600	-132	-672	1481	77	-1082	-642	1364	3134
-	206	979	-178	-352	-36	372	585	-635	438	-130	-677	-164	41	-73	-335	-54	27	-12	255	97
-	-305	-8765	-2410	-732	-1329	-3863	-103	*	*											
371	-378	44	2641	-254	-258	-563	-350	-1570	281	-440	-1611	181	-566	-1008	-838	989	908	947	1190	110
-	206	979	-178	-352	-36	372	585	-635	438	-130	-677	-164	41	-73	-335	-54	27	12	255	97
-	-6	-8461	-9461	-732	-1329	-4025	-91	*	*											
372	-162	44	-446	-254	-971	-414	237	-1570	-282	-815	-641	-480	-336	-1008	-582	2325	-552	-947	1190	572
	206	979	-178	-352	-36	372	585	-635	438	-130	-677	-164	41	-73	-335	-54	27	-12	-255	-97
-	-37	-8461	-5454	-732	-1329	-4025	-91	*	*											
373	-712	62	-1096	-547	-954	-546	-333	2531	-215	-1048	-1594	-655	808	-218	-261	-698	-534	-422	-1172	-1014
-	206	979	-179	-352	-36	372	585	-631	438	-130	-677	-164	41	-73	-335	-54	27	-12	-255	-97
-	-2831	-298	-4438	-88	-4075	-4041	-90	*	*											
374	-676	97	498	-1234	-289	-510	-297	-627	-444	-282	-1558	-560	-841	-955	-1217	-477	-562	2437	-1137	-979
-	206	979	-178	-352	-36	372	585	-635	438	-130	-677	-164	41	-73	-335	-54	27	-12	-255	-97
-	-1275	-8364	-776	-732	-1329	-4070	-89	*	*											
375	-129	644	-514	-688	312	37	250	448	334	65	-1012	-500	262	-408	-670	556	-309	286	-590	-432
-	206	979	-178	-352	-36	372	585	-635	438	-130	-677	-164	41	-73	-335	-54	27	-12	-255	-97
-	-103	-7069	-4020	-732	-1329	-2036	-403	*	*											
376	-656	118	-1040	-1214	-446	-489	-276	304	-424	-740	-716	-1026	354	-934	-1196	-915	-217	-874	-1116	3410
-	206	979	-178	-352	-36	372	585	-635	438	-130	-677	-164	41	-73	-335	-54	27	-12	-255	-97
-	-71	-8327	-4470	-732	-1329	-4086	-88	*	*											
377	-300	152	-1006	-1180	-348	-456	230	-748	361	-958	-1504	2999	-787	-118	-1163	-882	-801	-840	-1082	-351
-	206	979	-178	-352	-36	372	585	-635	438	-130	-677	-164	41	-73	-335	-54	27	-12	-255	-97
-	-7	-8262	-9262	-732	-1329	-4112	-86	*	*											
378	-300	152	-1006	-838	335	-456	-243	-992	-390	-958	-1504	-547	-787	-901	-810	2329	-801	-391	-1082	490
-	206	979	-178	-352	-36	372	585	-635	438	-130	-677	-164	41	-73	-335	-54	27	-12	-255	-97
-	-7	-8262	-9262	732	-1329	-4112	-86	*	*											

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	206	979	-178	352	-36	372	585	-635	438	-130	677	-164	41	-73	-335	54	27	12	-255	97
	-7	-8262	9262	732	1329	-4112	-86	*	*											
380	-622	152	1006	752	3117	-456	-243	-1463	-200	-958	1504	432	-272	444	-1163	-579	-801	546	1082	84
	206	979	-178	352	-36	372	585	-635	438	-130	-677	-164	41	-73	-335	-54	27	-12	255	-97
	-7	8262	9262	-732	-1329	-4112	-86	*	*											
381	-622	152	-1006	-1180	73	-456	230	-930	-390	-958	3816	-2	-787	-901	-1163	-882	87	-286	-1082	-363
	206	979	-179	-352	-36	372	585	-635	438	-130	-676	-164	40	-69	-335	-54	27	-12	-255	-97
	-2662	251	9262	95	3972	-4112	-86	*	*											
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	206	979	-178	352	-36	372	585	-635	438	-130	-677	-164	41	-73	-335	-54	27	-12	-255	-97
	-7	8262	-9262	-732	-1329	-4112	-86	*	*											
383	-418	152	-1006	-1180	-190	456	-243	-1463	-390	2018	-1504	-992	-58	-901	-346	-489	-487	5	-1082	-924
	206	979	-178	352	-36	372	585	-635	438	-130	-677	-164	41	-73	-335	-54	27	-12	-255	-97
	-7	-8262	-9262	-732	-1329	-4112	-86	*	*											
384	-364	152	-571	-1180	-864	65	-243	-1463	2664	-446	-124	-992	-457	-526	-731	-882	-448	-840	-1082	-924
	206	979	-178	352	-36	372	585	-635	438	-130	-677	-164	41	-73	-335	-54	27	-12	-255	-97
	-7	8262	-9262	732	-1329	-4112	-86	*	*											
385	-364	152	-1006	-1180	-864	-456	-243	-794	-149	-532	-1504	-992	-162	-206	66	-882	2634	-840	-1082	-461
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NULE      595  -1558     85    338   -294    453  -1158    197    249    902  -1085   -142    -21   -313     45    531    201    384  -1998   -644
HMM         A      C      D      E      F      G      H      I      K      L      M      N      P      Q      R      S      T      V      W      Y

          m->m   m->i   m->d   i->m   i->i   d->m   d->d   b->m   m->e
           -11      *  -7037
      1    136    909   -249   -422   -106    302    515   -706    367   -201   -747   -235    -30   1063   -405   -124    -44    -83   -325   -167
      -    206    979   -178   -352    -36    372    585   -635    438   -130   -677   -164     41    -73   -335    -54     27    -12   -255    -97
      -    -33  -6059  -7059   -732  -1329    -76  -4293    -11      *
      2    136    909   -249   -422   -106    302    515   -706    367   -201   -747   -235    -30   1063   -405   -124    -44    -83   -325   -167
      -    206    979   -178   -352    -36    372    585   -635    438   -130   -677   -164     41    -73   -335    -54     27    -12   -255    -97
      -    -33  -6059  -7059   -732  -1329    -76  -4293      *      *
      3    136    909   -249   -422   -106    302    515   -706    367   -201   -747   -235    -30   1063   -405   -124    -44    -83   -325   -167
      -    206    979   -178   -352    -36    372    585   -635    438   -130   -677   -164     41    -73   -335    -54     27    -12   -255    -97
      -    -33  -6059  -7059   -732  -1329    -76  -4293      *      *
      4    136    909   -249   -422   -106    302    515   -706    367   -201   -747   -235    961   -143   -405   -124    -44    -83   -325   -167
      -    206    979   -178   -352    -36    372    585   -635    438   -130   -677   -164     41    -73   -335    -54     27    -12   -255    -97
      -    -33  -6059  -7059   -732  -1329    -76  -4293      *      *
      5    136    909   -249   -422   -106    302    515   -706    367   -201   -747   -235    -30   1063   -405   -124    -44    -83   -325   -167
      -    206    979   -178   -352    -36    372    585   -635    438   -130   -677   -164     41    -73   -335    -54     27    -12   -255    -97
      -    -33  -6059  -7059   -732  -1329    -76  -4293      *      *
      6    136    909   -249   -422   -106    302    515   -706    367   -201   -747   -235    -30   1063   -405   -124    -44    -83   -325   -167
      -    206    979   -178   -352    -36    372    585   -635    438   -130   -677   -164     41    -73   -335    -54     27    -12   -255    -97
      -    -33  -6059  -7059   -732  -1329    -76  -4293      *      *
      7    136    909   -249   -422   -106    302    515   -706    367   -201   -747   -235    -30   1063   -405   -124    -44    -83   -325   -167
      -    206    979   -178   -352    -36    372    585   -635    438   -130   -677   -164     41    -73   -335    -54     27    -12   -255    -97
      -    -33  -6059  -7059   -732  -1329    -76  -4293      *      *
      8    136    909   -249   -422   -106    302    515   -706    367   -201   -747   -235    -30   1063   -405   -124    -44    -83   -325   -167
      -    206    979   -178   -352    -36    372    585   -635    438   -130   -677   -164     41    -73   -335    -54     27    -12   -255    -97
      -    -33  -6059  -7059   -732  -1329    -76  -4293      *      *
      9    136    909   -249   -422   -106    302    515   -706    367   -201   -747   -235    -30   1063   -405   -124    -44    -83   -325   -167
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      -    -33  -6059  -7059   -732  -1329    -76  -4293      *      *
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10	136	909	-249	-422	-106	302	515	-706	367	-201	-747	-235	961	-143	-405	-124	-44	-83	-325	-167
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-	-33	-6059	-7059	-732	-1329	-76	-4293	*	*											
11	136	909	-249	-422	-106	302	515	-706	367	-201	-747	-235	-30	1063	-405	-124	-44	-83	-325	-167
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-	-33	-6059	-7059	-732	-1329	-76	-4293	*	*											
12	136	909	-249	-422	-106	302	515	-706	367	-201	-747	-235	-30	1063	-405	-124	-44	-83	-325	-167
-	206	979	-178	-352	-36	372	585	-635	438	-130	-677	-164	41	-73	-335	-54	27	-12	-255	-97
-	-33	-6059	-7059	-732	-1329	-76	-4293	*	*											
13	136	909	-249	-422	-106	302	515	-706	367	-201	-747	-235	-30	1063	-405	-124	-44	-83	-325	-167
-	206	979	-178	-352	-36	372	585	-635	438	-130	-677	-164	41	-73	-335	-54	27	-12	-255	-97
-	-33	-6059	-7059	-732	-1329	-76	-4293	*	*											
14	136	909	-249	-422	-106	302	515	-706	367	-201	-747	-235	-30	1063	-405	-124	-44	-83	-325	-167
-	206	979	-178	-352	-36	372	585	-635	438	-130	-677	-164	41	-73	-335	-54	27	-12	-255	-97
-	-33	-6059	-7059	-732	-1329	-76	-4293	*	*											
15	136	909	-249	-422	-106	302	515	-706	367	-201	-747	-235	-30	1063	-405	-124	-44	-83	-325	-167
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NULE      595  -1558     85    338   -294    453  -1158    197    249    902  -1085   -142    -21   -313     45    531    201    384  -1998   -644
HMM         A      C      D      E      F      G      H      I      K      L      M      N      P      Q      R      S      T      V      W      Y
          m->m   m->i   m->d   i->m   i->i   d->m   d->d   b->m   m->e
         -3313      *   -153
      1  -2006   -395    833   -323     20   -987    -87  -1346    818  -1002   -484   2097    619  -1582   1057   -721  -3162   -286  -3443    331
      -    206    979   -178   -352    -36    372    585   -635    438   -130   -677   -164     41    -73   -335    -54     27    -12   -255    -97
      -     -1 -11422 -12422   -732  -1329  -2961   -198  -3313      *
      2  -2512  -2622    185    188  -1714  -3229   -260    -68    843    313   -747   1681   1217  -1305   1057  -1412  -1025  -2025   3856   1049
      -    206    979   -178   -352    -36    372    585   -635    438   -130   -677   -164     41    -73   -335    -54     27    -12   -255    -97
      -     -13 -11877  -6880   -732  -1329  -2678   -245      *      *
      3  -2529  -2893    701   1240  -1595  -1962    719  -1261    757   -497  -4549   1694   1508    370    441  -3927  -2519  -1239  -4128    238
      -    206    979   -178   -352    -36    372    585   -635    438   -130   -677   -164     41    -73   -335    -54     27    -12   -255    -97
      -     -22 -12166  -6060   -732  -1329  -3117   -177      *      *
      4  -1115    146    -193    974   -601   -616   1110  -2630    -62    436  -3032   1870     92   -880    636     43  -3952  -1139  -4234     -6
      -    206    979   -178   -352    -36    372    585   -635    438   -130   -677   -164     41    -73   -335    -54     27    -12    255    -97
      -     -11 -12277  -7063   -732  -1329  -3175   -169      *      *
      5   -805  -1610   -949    452   -636  -2132    508   -542   -184  -1142  -1649   2490   1022  -1501   1323  -1196  -1455   -712   4313    -38
      -    206    979   -178   -352    -36    372    585   -635    438   -130   -677   -164     41    -73   -335    -54     27    -12   -255    -97
      -      -7 -12360  -7700   -732  -1329  -3492   -134      *      *
      6  -1573   1857   -354   -547  -4171  -1106   -747   -383    739   -850    337   2126  -1109   -659   1402   -696  -1960    343  -4390    -39
      -    206    979   -178   -352    -36    372    585   -635    438   -130   -677   -164     41    -73   -335    -54     27    -12   -255    -97
      -      0 -12442 -13442   -732  -1329  -4491    -66      *      *
      7  -1154   -990   -531   -536  -1736  -1175  -2103   -912   1508  -1372  -4838   2038     27   -338   1187   -296   -618    453  -4417   -582
      -    206    979   -178   -352    -36    372    585   -635    438   -130   -677   -164     41    -73   -335    -54     27    -12   -255    -97
      -      0 -12469 -13469   -732  -1329  -3826   -105      *      *
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      -      0 -12521 -13521   -732  -1329  -5096    -43      *      *
      9   -828  -1362     94   -970   -172  -1858   -657    152    644   -599   -215   2455    679  -1316   1124  -1202  -2654   -988  -4474   -397
      -    206    979   -178   -352    -36    372    585   -635    438   -130   -677   -164     41    -73   -335    -54     27    -12   -255    -97
      -      0 -12530 -13530   -732  -1329  -5069    -44      *      *
     10  -2068  -1459   -138  -4586   -718  -1608   -199   -443   1182  -1093   -568   1424    181   -304   2243  -1225  -3611  -1782  -4488   1811
      -    206    979   -178   -352    -36    372    585   -635    438   -130   -677   -164     41    -73   -335    -54     27    -12   -255    -97
      -     -21 -12545  -6134   -732  -1329  -4862    -50      *      *
     11  -1043  -3242   -394  -1929   -683  -1504   -344   -903   -413  -1541  -2680   1882    140   -516   1426   -505   -381     85  -4476   2439
      -    206    979   -178   -352    -36    372    585   -635    438   -130   -677   -164     41    -73   -335    -54     27    -12   -255    -97
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14	-373	-1470	496	-1379	19	-994	-90	1659	-512	-711	-237	1034	-115	-1475	94	6	-930	751	-2528	-871
-	206	979	-178	-352	-36	372	585	-635	438	-130	-677	-164	41	-73	-335	-54	27	-12	255	-97
-	-10	-12512	-7248	-732	-1329	-4888	-50	*	*											
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-	206	979	-178	-352	-36	372	585	-635	438	-130	-677	-164	41	-73	-335	-54	27	-12	-255	-97
-	-29	-12518	-5678	-732	-1329	-4123	-85	*	*											
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-	-37	-12519	-5305	-732	-1329	-5255	-38	*	*											
18	-617	-38	1962	239	-2921	-1525	1445	-365	-938	-667	-3116	-893	1504	-996	-414	-2129	-1306	-1	4436	1604
-	206	979	-178	-352	-36	372	585	-635	438	-130	-677	-164	41	-73	-335	-54	27	-12	-255	97
-	-10	-12489	-7206	-732	-1329	-6175	-20	*	*											
19	-825	-1074	1048	-148	-472	-777	2286	162	-834	-539	-1417	-341	431	-769	-1816	163	58	-844	-1727	1808
-	206	979	-178	-352	-36	372	585	-635	438	-130	-677	-164	41	-73	-335	-54	27	-12	-255	-97
-	-30	-12477	-5626	-732	-1329	-3986	-94	*	*											
20	-1195	-246	1258	164	851	-1087	1088	-986	-1158	-491	-4879	558	-871	-996	1208	973	898	-887	-2538	361
-	206	979	178	352	36	372	585	-635	438	-130	-677	-164	41	-73	-335	-54	27	-12	-255	-97
-	15	12511	6626	732	1329	4470	67	*	*											
21	620	1282	131	1614	909	1590	1436	-386	-838	-621	-4904	-631	-299	-1089	2275	883	-317	427	-4482	-321
-	206	979	178	352	36	372	585	-635	438	-130	-677	-164	41	-73	-335	-54	27	-12	-255	-97
-	36	12538	5352	732	1329	5480	33	*	*											
22	1116	-3227	-242	-789	2054	1452	-386	247	556	-1096	-1223	-1543	-670	-1128	1280	434	-301	1841	-4461	699
-	206	979	-178	-352	-36	372	585	-635	438	-130	-677	-164	41	-73	-335	-54	27	-12	-255	-97
-	-26	-12516	-5818	-732	-1329	-5100	-43	*	*											
23	-880	714	-1152	-491	-2311	-493	291	1027	175	62	-1882	260	-1363	-963	1661	-482	-2215	929	914	251
-	206	979	-178	-352	-36	372	585	-635	438	-130	-677	-164	41	-73	-335	-54	27	-12	-255	-97
-	-39	-12508	-5223	-732	-1329	-5108	-42	*	*											
24	-651	-926	-917	-860	-694	-172	-421	404	204	1308	-854	380	-643	-910	-766	-531	-724	1049	-4436	-293
-	185	947	-125	-333	-66	374	568	-599	415	-145	-677	-128	68	-82	-352	-30	18	-27	-281	-69
-	-6890	-20	-7519	-3284	-156	-5566	-31	*	*											
25	-133	-2277	1982	-431	150	-122	-851	-739	-1897	-1972	145	833	-1684	-2426	-2758	929	-303	-1374	-4492	2017
-	206	979	-178	-352	-36	372	585	-635	438	-130	-677	-164	41	-73	-335	-54	27	-12	-255	-97
-	0	-12551	-13551	-732	-1329	-2706	-240	*	*											
26	-284	-3351	798	-1685	418	-999	-2422	1316	-1225	-1932	-109	227	-1913	-2486	-4665	746	-1329	-1791	-4585	3121
-	206	979	-178	-352	-36	372	585	-635	438	-130	-677	-164	41	-73	-335	-54	27	-12	-255	-97
-	0	-12648	-13648	-732	-1329	-4136	-84	*	*											
27	-1004	-94	995	-1807	-85	-946	116	2124	-738	-2295	131	1412	-1562	-2505	-2078	-1412	-844	-580	369	1891
-	206	979	-178	-352	-36	372	585	-635	438	-130	-677	-164	41	-73	-335	-54	27	-12	-255	-97
-	0	-12672	-13672	-732	-1329	-4045	-90	*	*											
28	957	-1878	-1009	-1818	-683	-500	785	1258	-1489	-2359	-267	2198	-933	-570	-1096	-1557	-1968	-1694	-1138	2191
-	206	979	-178	-352	-36	372	585	-635	438	-130	-677	-164	41	-73	-335	-54	27	-12	-255	-97
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29	1778	-1321	-553	-2589	-825	-715	-1865	1570	-1655	-2267	-121	1696	-1454	219	-2064	-385	-929	-1060	623	230
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-	0	-12693	-13693	-732	-1329	-5009	-46	*	*											
30	952	-1886	-417	-1340	158	-1027	-1444	-1349	-187	-1345	-194	2335	-1599	-192	-879	861	-1545	-1754	111	1195
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-	-8	-12704	-7519	-732	-1329	-5885	-25	*	*											
31	1004	-2448	-1129	-1391	754	-114	-380	218	-620	-1989	-1407	618	64	-23	-485	-195	-434	-777	1483	2065
-	206	979	-178	-352	-36	372	585	-635	438	-130	-677	-164	41	-73	-335	-54	27	-12	-255	-97
-	-16	-12695	-6515	-732	-1329	-5244	-39	*	*											
32	-1308	-165	-836	-641	-357	-312	-373	1476	288	-1423	34	569	489	220	-495	175	-2376	-92	306	1640
-	206	979	-178	-352	-36	372	585	-635	438	-130	-677	-164	41	-73	-335	-54	27	-12	-255	-97
-	-11	-12686	-7134	-732	-1329	-5910	-24	*	*											
33	-1333	-3377	892	-1368	815	-493	-2831	1114	106	-873	1054	135	236	183	326	-1421	-355	-167	-4612	1414
-	206	979	-178	-352	-36	372	585	-635	438	-130	-677	-164	41	-73	-335	-54	27	-12	-255	-97
-	-16	-12675	-6490	-732	-1329	-5278	-38	*	*											
34	-182	-770	395	-213	-2090	1200	-419	689	-269	-849	1452	351	618	-689	-851	-720	-1547	-99	382	-107
-	206	979	-178	-352	-36	372	585	-635	438	-130	-677	-164	41	-73	-335	-54	27	-12	-255	-97
-	-12	-12669	-6966	-732	-1329	-5604	-30	*	*											
35	-461	-1432	1131	163	159	443	266	-882	-343	-2085	-854	-371	671	-893	-260	-431	480	-1762	-1110	2092
-	206	979	-178	-352	-36	372	585	-635	438	-130	-677	-164	41	-73	-335	-54	27	-12	-255	-97
-	-15	-12661	-6602	-732	-1329	-5239	-39	*	*											
36	17	-3354	-153	-181	192	1079	-131	-207	549	-3400	-365	185	-215	920	-493	-80	-412	-1817	-485	1604
-	206	979	-178	-352	-36	372	585	-635	438	-130	-677	-164	41	-73	-335	-54	27	-12	-255	-97
-	-25	-12651	-5854	-732	-1329	-4284	-76	*	*											
37	-95	-2407	-1716	112	-296	235	1049	-164	-237	-2199	-1035	113	694	1272	-580	-760	-175	-433	656	1978
-	206	979	-178	-352	-36	372	585	-635	438	-130	-677	-164	41	-73	-335	-54	27	-12	-255	-97
-	-21	12647	-6156	-732	1329	-4216	-80	*	*											
38	-174	338	-211	-1406	951	-492	-1270	235	1210	-4022	-848	351	710	395	1553	-485	23	-1439	408	748
-	206	979	-178	-352	-36	372	585	-635	438	-130	-677	-164	41	-73	-335	-54	27	-12	-255	-97
-	-16	-12654	-6484	-732	-1329	-4616	-60	*	*											
39	-111	243	-56	-941	88	-58	-467	-565	797	-575	-1630	420	301	1401	767	-209	-115	-1650	-1092	-56
-	206	979	-178	-352	-36	372	585	-635	438	-130	-677	-164	41	-73	-335	-54	27	-12	-255	-97
-	-12	-12653	-6941	-732	-1329	-4705	-56	*	*											
40	742	-1202	-796	-841	598	-1013	-642	-171	596	-2648	-367	-67	363	1484	-228	-196	73	-1277	1379	1136
-	206	979	-178	-352	-36	372	585	-635	438	-130	-677	-164	41	-73	-335	-54	27	-12	-255	-97
-	-15	-12657	-6570	-732	-1329	-4139	-84	*	*											
41	-183	-808	-1023	-217	947	-771	168	850	-130	-1164	-106	268	-131	157	-194	-890	-334	-1099	1598	2085
-	206	979	-178	-352	-36	372	585	-635	438	-130	-677	-164	41	-73	-335	-54	27	-12	-255	-97
-	-10	-12671	-7282	-732	-1329	-4382	-71	*	*											
42	635	271	-1145	-275	-71	-1001	-1626	1987	-972	-542	1270	-3702	-227	545	-2845	-1190	350	-869	717	768
-	206	979	-178	-352	-36	372	585	-635	438	-130	-677	-164	41	-73	-335	-54	27	-12	-255	-97
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43	1432	596	-2062	-1453	322	-286	-1715	929	-2064	-489	897	-2401	-109	707	-4699	-2245	708	-30	368	1246
-	206	979	-178	-352	-36	372	585	-635	438	-130	-677	-164	41	-73	-335	-54	27	-12	-255	-97
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44	938	759	-1564	-835	-1721	-754	-422	1475	-1905	-1226	474	-1141	414	1281	-2400	-1224	1569	-768	-1127	-966
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-	-3	-12681	-9031	-732	-1329	-5287	-37	*	*											
45	831	-591	-384	903	-1220	32	-250	-466	-1603	-1030	-1663	-1152	-125	2493	-4699	-1913	1275	-41	1370	-1514
	206	979	-178	352	-36	372	585	635	438	-130	-677	-164	41	-73	-335	-54	27	-12	-255	-97

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46	-519	207	-923	322	540	1468	-134	-2135	-1924	-1120	-2342	-1955	1148	1435	-1448	-2899	1414	404	1148	-1635
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-	0	-12697	-13697	-732	-1329	-5260	-38	*	*											
47	-1991	856	-969	-954	-734	669	241	-1817	-258	-270	201	-1029	2099	2045	-2870	-1172	-439	-1270	2021	-4482
-	206	979	-178	-352	-36	372	585	-635	438	-130	-677	-164	41	-73	-335	-54	27	-12	-255	-97
-	0	-12706	-13706	-732	-1329	-5513	-32	*	*											
48	-1790	-595	467	-474	-885	665	647	-1137	-255	666	783	-192	1514	-693	-76	-910	-94	-500	726	-2854
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49	-911	663	148	-145	70	-2312	-1881	-1610	96	-290	1458	569	1940	450	-1777	-437	10	-116	1032	-2073
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50	-1244	-537	-151	257	266	-1473	1360	-857	-167	480	729	64	195	90	-1129	-862	904	216	1730	-1284
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51	-374	844	-41	560	-267	-1993	-46	-218	-332	-1208	420	-507	149	-554	-575	-418	1754	-339	2499	2316
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52	-1783	568	-98	558	617	-1019	251	637	-1679	-870	1187	-697	-2460	151	-239	-1094	1126	1096	1669	1545
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53	-738	-258	596	581	674	-2543	383	516	-1332	-1280	1047	476	-4346	504	-259	-834	1087	199	2286	3448
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54	1618	1545	1804	103	1272	1348	60	-1082	-304	-1348	1306	-131	-2767	-452	-67	-1370	-189	-29	3118	1032
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55	1962	128	913	268	2328	611	-892	-1996	-33	-800	1373	-1388	-1815	412	-464	-1640	-1162	-544	3085	818
	206	979	178	352	36	372	585	-635	438	-130	-677	-164	41	-73	-335	-54	27	-12	-255	-97
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56	-2030	-167	1129	-268	1248	-1975	14	-1267	-1121	-1015	1740	-624	-4479	-797	503	-1769	-543	-291	4209	-1480
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57	-1811	-721	-4706	-595	1495	-2408	-799	350	-278	-1046	1468	-237	-2131	868	1312	-924	-128	-81	3487	-2152
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-	-35	-12853	-5403	-732	-1329	-5500	-32	*	*											
58	-658	943	-166	-422	-3682	-1803	-906	-24	-1196	-2998	3055	-1011	-2823	313	375	-2719	-925	966	3684	-387
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-	-22	-12815	-6077	-732	-1329	-4689	-57	*	*											
59	-1538	788	-1509	304	-1222	-2966	-1609	845	-1374	-631	1923	-1197	-2803	-9	1165	-835	-274	1455	2293	-188
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60	-969	-810	-2255	602	-868	-2276	300	602	-1080	-574	2531	-1197	-1381	1171	-3005	-1609	-895	923	3486	-1387
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-	-7	-12843	-7670	-732	-1329	-4523	-64	*	*											
61	-2446	622	-1290	1085	-1280	-1130	-74	478	-98	-612	-187	136	-2092	1535	-602	-587	-863	1134	2455	-1173
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-	-7	-12841	-7660	-732	-1329	-4799	-53	*	*											
62	-2704	791	-2319	1058	-3714	-525	-131	-509	127	-1926	1360	521	-2839	1424	-775	-163	37	497	3129	661

	206	979	-178	-352	-36	372	585	-635	438	-130	-677	-164	41	-73	-335	-54	27	-12	-255	97				
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63	-1611	-52	220	924	-4552	-999	74	-491	802	-1826	1273	609	-2234	596	1051	-502	299	591	352	-1312				
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64	-720	1173	-1656	-858	-4544	-734	1148	287	-34	-577	534	393	-1414	583	-14	472	809	977	-4763	-235				
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65	-33	1866	-2162	-46	-4544	-1165	99	735	-189	-1177	798	948	-237	-529	496	-432	667	870	-1275	-2408				
	206	979	-178	-352	-36	372	585	-635	438	-130	-677	-164	41	-73	-335	-54	27	-12	255	-97				
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66	-358	1781	-1090	-154	-4537	-1459	-2405	521	-1900	-75	417	-699	-1579	-145	-901	172	744	1796	1263	86				
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67	-834	247	-2173	-418	-1922	-2328	-128	1809	115	-401	1959	-1079	-1441	-23	-1315	-1181	847	1109	-1239	-366				
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68	-912	894	-1885	590	-1112	-721	-1361	1069	-1587	287	1811	-446	-4456	-1015	-1522	-1311	-117	1811	1253	463				
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69	-465	-209	-1356	-465	-1881	-910	-1870	525	-88	153	2828	-1408	-1763	-551	-179	-1774	300	1295	612	351				
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70	-1405	1181	-2361	-134	-2712	-1051	-3931	239	-202	656	2019	99	-513	-416	260	-1156	268	1160	963	-1053				
	206	979	-178	-352	-36	372	585	-635	438	-130	-677	-164	41	-73	-335	-54	27	-12	255	-97				
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71	-1467	908	-2720	369	-2397	-588	-1244	-1682	299	-105	2607	-283	-630	-1074	521	-417	1442	-294	410	-379				
	206	979	-178	-352	-36	372	585	-635	438	-130	-677	-164	41	-73	-335	-54	27	-12	-255	-97				
	16	12851	-5358	732	-1329	-4743	-55	*	*															
72	2421	1682	-932	1021	-1849	-500	-3910	-678	691	219	603	357	-869	-149	640	-1039	901	234	-308	2237				
	206	979	-178	-352	-36	372	585	-635	438	-130	-677	-164	41	-73	-335	-54	27	-12	-255	-97				
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73	-837	1377	-344	1505	-541	-299	-1848	-1910	726	232	-116	103	-390	-347	-656	-940	707	170	-4762	-919				
	206	979	-178	-352	-36	372	585	-635	438	-130	-677	-164	41	-73	-335	-54	27	-12	-255	-97				
	-10	-12832	-7280	-732	-1329	-4113	-86	*	*															
74	-1424	1877	58	1719	-1332	-222	-1045	-1189	1011	-190	-1421	-652	-2085	888	441	-870	-1257	-128	-1279	-1483				
	206	979	-178	-352	-36	372	585	-635	438	-130	-677	-164	41	-73	-335	-54	27	-12	-255	-97				
	-22	-12842	-6071	-732	-1329	-4809	-52	*	*															
75	-900	1692	-6	2011	-1041	284	-3916	-1645	629	-163	279	-407	-1204	-222	-1496	-2170	-829	-141	-1257	614				
	206	979	-178	-352	-36	372	585	-635	438	-130	-677	-164	41	-73	-335	-54	27	-12	-255	-97				
	-21	-12825	-6129	-732	-1329	-4558	-63	*	*															
76	-1031	1169	-358	1056	-675	267	-52	-2185	1207	-2122	-342	-697	-2543	615	1501	-1408	-1695	173	1421	188				
	206	979	-178	-352	-36	372	585	-635	438	-130	-677	-164	41	-73	-335	-54	27	-12	-255	-97				
	-83	-12813	-4172	-732	-1329	-3423	-141	*	*															
77	-1830	1015	-272	981	-924	778	-639	-2217	903	-2812	-1705	526	-455	907	538	-564	-806	-610	752	1348				
	206	979	-178	-352	-36	372	585	-635	438	-130	-677	-164	41	-73	-335	-54	27	-12	-255	-97				
	-44	-12751	-5073	-732	-1329	-3334	-151	*	*															
78	-733	922	-712	55	-1738	409	-1307	-2303	1490	-1210	752	-1160	-958	494	797	-870	-410	-365	2564	759				
	206	979	-178	-352	36	372	585	-635	438	-130	-677	-164	41	-73	-335	-54	27	-12	-255	97				
	19	12758	6300	-732	1329	-2716	-238	*	*															

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79	-771	2513	-856	765	-1645	472	-737	-1437	995	-2390	-2074	-461	704	46	914	-861	-926	1128	1304	782
-	206	979	-178	-352	-36	372	585	-635	438	-130	-677	-164	41	-73	-335	-54	27	-12	-255	-97
-	-15	-12796	-6587	-732	-1329	-3325	-152	*	*											
80	-1118	1957	318	152	-1388	-888	-422	-1022	1514	-1964	-1008	-798	90	845	986	-468	-1161	-275	1454	360
-	206	979	-178	-352	-36	372	585	-635	438	-130	-677	-164	41	-73	-335	-54	27	-12	-255	-97
-	-10	-12817	-7251	-732	-1329	-3122	-176	*	*											
81	-684	3300	-227	605	-858	-824	-248	-915	901	-1206	-5206	-1941	147	773	-351	-1594	-533	-219	1180	861
-	206	979	-178	-352	-36	372	585	-635	438	-130	-677	-164	41	-73	-335	-54	27	-12	-255	-97
-	-9	-12855	-7298	-732	-1329	-4253	-78	*	*											
82	-128	2043	339	313	-2080	-295	-356	-1056	790	-1367	376	-2564	15	178	-494	-1241	-526	-109	2027	1829
-	206	979	-178	-352	-36	372	585	-635	438	-130	-677	-164	41	-73	-335	-54	27	-12	-255	-97
-	-7	-12861	-7781	-732	-1329	-4186	-82	*	*											
83	-960	2630	-184	572	-78	-796	-255	-1168	-679	-2023	-736	-1591	825	1119	-197	-723	-588	-948	2545	1573
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-	-10	-12867	-7235	-732	-1329	-4096	-87	*	*											
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-	-15	-12870	-6573	-732	-1329	-4774	-54	*	*											
86	-1961	-155	-1180	356	-2838	-790	-936	-906	-538	-1012	-980	62	1877	-24	-209	-1409	-96	-921	2867	2276
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-	206	979	-178	-352	-36	372	585	-635	438	-130	-677	-164	41	-73	-335	-54	27	-12	-255	-97
-	-18	-12810	-6372	-732	-1329	-2717	-238	*	*											
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-	206	979	-178	-352	-36	372	585	-635	438	-130	-677	-164	41	-73	-335	-54	27	-12	-255	-97
-	-9	-12848	-7295	732	-1329	-3856	-103	*	*											
89	-302	-1057	-446	1077	-471	911	240	-659	153	-934	-475	113	-1099	337	70	-331	85	59	-1996	284
-	202	977	-178	-344	-37	373	583	-630	436	-135	-681	-163	38	-69	-329	-54	29	-14	-260	-91
-	-5713	-34	-7969	-4	-8543	-4323	-74	*	*											
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-	202	975	-179	-346	-36	372	581	-633	434	-132	-668	-165	39	-73	-336	-51	34	-11	-261	-93
-	-5821	-33	-7650	-4	-8516	-4433	-68	*	*											
91	-638	-2583	-739	106	297	-282	489	-231	-495	-636	358	-110	-871	-821	-157	-373	960	303	-4754	2162
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92	-1480	20	-503	-649	21	1122	869	121	-613	-757	-696	432	-1775	323	353	-757	399	23	-4762	1625
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93	-2350	1019	677	-822	447	345	1187	-129	139	-1183	695	-460	-2106	-120	-1229	-675	-283	898	-1235	1867
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94	-2120	269	845	-724	85	149	-459	1251	423	-1011	324	-1246	-1874	192	-173	-1107	500	848	-2780	423
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95	-1911	-194	-708	485	129	-2851	-531	694	188	191	589	148	-1235	-14	372	-422	793	840	1483	470
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-	0	-12858	-13858	-732	-1329	-5290	-37	*	*										
96	-1327	-8	-38	477	605	-3394	-1105	956	402	-906	810	-252	-1542	-726	-78	-1476	357	1601	1285	-494
-	206	979	-178	-352	-36	372	585	-635	438	-130	-677	-164	41	-73	-335	-54	27	-12	-255	-97
-	-14	-12858	-6667	-732	-1329	-4908	-49	*	*											
97	-347	1435	-178	40	-81	-3716	-140	-179	36	170	366	-1	-2821	-24	82	-504	1005	1136	-2796	-1220
-	206	979	-178	-352	-36	372	585	-635	438	-130	-677	-164	41	-73	-335	-54	27	-12	-255	-97
-	-7	-12843	-7632	-732	-1329	-4707	-56	*	*											
98	-1095	1031	-238	802	-797	-1683	-282	76	-701	187	228	573	-1874	-871	-1228	-381	715	1391	-1262	-111
-	206	979	-178	-352	-36	372	585	-635	438	-130	-677	-164	41	-73	-335	-54	27	-12	-255	-97
-	-7	-12843	-7632	-732	-1329	-3451	-138	*	*											
99	-1526	1325	470	1207	-1638	-3729	-927	451	-78	-199	-134	-61	-2366	-156	-161	-97	1212	344	-4784	-355
-	202	975	-177	-345	-39	367	581	-634	439	-128	-668	-166	39	-74	-335	-49	26	-10	-257	-93
-	-7255	-10	-13855	-4	-8536	-4647	-59	*	*											
100	-1157	811	656	939	-2062	-1582	146	-918	470	-202	1118	109	-2589	-536	-465	-289	710	768	1999	307
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-	-19	-12819	-6299	-732	-1329	-3445	-139	*	*											
101	-221	-1142	43	813	-1399	-1960	1113	-1	272	-823	-566	-447	-780	-1131	-444	385	949	708	2008	626
-	206	979	-178	-352	-36	372	585	-635	438	-130	-677	-164	41	-73	-335	-54	27	-12	-255	-97
-	-10	-12834	-7266	-732	-1329	-3940	-97	*	*											
102	-769	1179	372	1340	-995	-660	-1063	-965	804	-796	-1070	-464	-1598	-2369	571	-343	570	525	262	35
-	203	984	-177	-348	-33	368	580	-633	436	-132	-671	-163	37	-73	-333	-54	30	-14	-253	86
-	-6335	-42	-5945	-4	-8489	-4176	-82	*	*											
103	-1078	595	168	297	858	-1119	1408	184	-3	-191	-772	-39	-502	-138	154	-505	-68	225	-1465	834
-	206	979	178	352	36	372	585	-635	438	-130	-677	-164	41	-73	-335	-54	27	-12	-255	-97
-	-23	12798	5565	732	1329	3987	-94	*	*											
104	443	67	1254	85	882	1659	-291	-183	-1118	100	405	108	-2674	-565	10	-95	117	-32	-1458	1460
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-	-24	12795	5939	732	1329	4128	-85	*	*											
105	-607	898	53	243	259	1165	640	-144	-711	122	-635	-1322	-231	-909	943	-2636	973	-561	470	2003
-	206	979	178	352	-36	372	585	-635	438	-130	-677	-164	41	-73	-335	-54	27	-12	-255	-97
-	-22	-12785	-6046	-732	-1329	-3658	-119	*	*											
106	-1064	-1069	-332	-1098	41	-1096	885	712	30	-353	-58	-666	-2833	677	1119	-841	1090	-50	559	966
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-	-59	-12795	-4650	-732	-1329	-4175	-82	*	*											
107	-1054	288	-507	-514	706	-2313	1035	240	261	215	456	-101	-2070	-614	323	-521	230	610	1026	1085
-	206	979	-178	-352	-36	372	585	-635	438	-130	-677	-164	41	-73	-335	-54	27	-12	-255	-97
-	-60	-12746	-4625	-732	-1329	-3354	-148	*	*											
108	-2788	302	-935	-28	565	-3288	-2353	31	628	312	-993	378	-2621	650	1575	-794	667	472	-1930	-818
-	206	979	-178	-352	-36	372	585	-635	438	-130	-677	-164	41	-73	-335	-54	27	-12	-255	-97
-	-30	-12709	-5614	-732	-1329	-4985	-46	*	*											
109	-1561	-581	-1074	157	-313	-1563	-16	-453	781	829	-199	-106	-1876	159	1134	-351	678	63	-4626	-202
-	206	979	-178	-352	-36	372	585	-635	438	-130	-677	-164	41	-73	-335	-54	27	-12	-255	-97
-	-69	-12689	-4428	-732	-1329	-3678	-117	*	*											
110	-2015	1153	-1185	76	1213	-2397	415	223	328	566	-1570	-1844	-2371	359	1368	-483	674	-457	-478	-557
-	151	921	-169	-296	-41	337	600	-613	433	-150	-685	-141	14	6	-255	-60	56	-10	-247	-97
-	-7060	-11	-13660	-3815	-106	-4215	-80	*	*											
111	-1499	-242	-1651	592	829	-2136	842	102	-103	-1648	-274	-3917	-407	1057	1752	-471	-41	643	474	169
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113	-579	-475	-667	-766	396	-3106	1759	499	-1654	-416	-54	-3407	-94	1011	842	-1058	521	905	1053	562
-	206	979	-178	-352	-36	372	585	-635	438	-130	-677	-164	41	-73	-335	-54	27	-12	-255	-97
-	-7	-12939	-7776	-732	-1329	-2910	-206	*	*											
114	-1711	-1599	-354	-599	645	-2460	2285	-1182	46	-368	56	-1104	-338	965	-456	-1490	1003	575	2373	320
-	206	979	-178	-352	-36	372	585	-635	438	-130	-677	-164	41	-73	-335	-54	27	-12	-255	-97
-	-7	-12962	-7801	-732	-1329	-3654	-119	*	*											
115	-1892	-740	-945	-1988	1052	-2259	2645	-542	-1427	-648	-292	-1437	372	1706	-922	-1008	-387	638	2054	1215
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116	-1916	-2698	-12	-1310	1668	-1056	2549	-1272	-1920	-991	-2051	-2001	620	938	853	-1651	152	-1237	1616	1692
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-	-36	-12998	-5336	-732	-1329	-3357	-148	*	*											
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-	-2	-12981	-9498	-732	-1329	-4319	-74	*	*											
119	-488	124	-276	-1000	113	-596	1425	-654	-1141	-196	-1189	-144	1153	1051	-1355	-1617	805	-543	2906	-58
-	206	979	-178	-352	-36	372	585	-635	438	-130	-677	-164	41	-73	-335	-54	27	-12	-255	-97
-	-13	-12983	-6848	-732	-1329	-4135	-85	*	*											
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-	206	979	178	-352	-36	372	585	-635	438	-130	-677	-164	41	-73	-335	-54	27	-12	-255	-97
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121	-482	-1654	863	212	-183	-870	1116	-1267	-2773	-1293	-1599	-1774	1457	-1105	-1648	-735	1032	-739	3858	-2606
-	206	979	178	352	-36	372	585	-635	438	-130	-677	-164	41	-73	-335	-54	27	-12	-255	-97
-	-21	13006	6108	732	-1329	-3325	-152	*	*											
122	-1016	3693	1571	-823	-704	84	1807	-1053	-270	-939	-2921	-1882	1956	-1110	-665	-579	-840	-1069	2655	-812
-	206	979	-178	-352	-36	372	585	-635	438	-130	-677	-164	41	-73	-335	-54	27	-12	-255	-97
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123	-956	-121	1800	-522	-317	307	1105	-1559	-859	-1398	-3685	-2085	1341	-858	-414	-882	-689	-255	3031	53
-	206	979	-178	-352	-36	372	585	-635	438	-130	-677	-164	41	-73	-335	-54	27	-12	-255	-97
-	-5	-13015	-8200	-732	-1329	-3754	-111	*	*											
124	-616	-1191	578	-735	-109	680	2015	-1180	-973	-1181	-1446	-654	1867	557	-1230	-840	-598	590	2912	-1118
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-	-32	-13018	-5500	-732	-1329	-3777	-109	*	*											
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126	-1302	-95	-1063	-885	-500	372	1216	206	-310	-1257	-81	-637	1642	373	-830	96	429	799	-4942	-974
-	206	979	-178	-352	-36	372	585	-635	438	-130	-677	-164	41	-73	-335	-54	27	-12	-255	-97
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127	-893	69	-197	231	-1683	400	-527	-672	150	-375	-614	-1520	2259	-1503	-1953	18	80	226	-4951	-452
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128	-67	-1303	573	-298	383	-738	-297	-1812	-540	-591	-827	-489	1666	164	-2685	625	658	269	-1532	749
	206	979	178	-352	-36	372	585	635	438	-130	-677	-164	41	-73	-335	-54	27	-12	-255	-97
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-	206	975	-171	-350	-33	371	584	-635	436	-130	-677	-164	46	-75	-338	-53	26	12	-261	-99					
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133	-335	-915	-176	-1353	1011	-40	-36	506	40	1276	325	-196	142	-849	-445	-294	-1503	300	-4984	-3057					
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143	-293	901	-32	71	-864	1122	1657	-319	-1080	-1729	-1897	-792	1293	-590	-144	93	-400	135	-4840	-376					
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161	-1301	1998	-566	-1965	1671	983	-3904	853	-1386	258	551	-2809	-1236	-1924	-1581	-1754	90	1012	-1670	213
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-	206	979	-178	-352	-36	372	585	-635	438	-130	-677	-164	41	-73	-335	-54	27	-12	-255	-97
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-	206	979	-178	-352	-36	372	585	-635	438	-130	-677	-164	41	-73	-335	-54	27	-12	-255	-97
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-	206	979	-178	-352	-36	372	585	-635	438	-130	-677	-164	41	-73	-335	-54	27	-12	-255	-97
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168	-599	1045	-816	22	-2435	-1663	661	764	-212	983	2145	-1009	-4452	-624	357	-1116	524	775	-941	-1648
-	206	979	-178	-352	-36	372	585	-635	438	-130	-677	-164	41	-73	-335	-54	27	-12	-255	-97
-	-12	-12817	-6975	-732	-1329	-5662	-29	*	*											
169	-576	574	440	560	-1875	-805	-1940	31	-448	868	642	611	-2086	801	-102	-1823	-1253	1032	-4735	-1003
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170	-1409	490	-297	334	-2740	-590	-330	269	416	973	1377	-154	-4439	1282	536	-945	-1364	-63	-2712	500
-	206	979	-178	-352	-36	372	585	-635	438	-130	-677	-164	41	-73	-335	-54	27	-12	-255	-97
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171	2539	740	-280	1124	1423	-754	-20	259	371	642	1856	-1171	-2033	988	-147	-879	777	196	4726	103
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172	-17	183	-132	-27	-390	682	637	402	764	-283	1160	-282	-3709	675	1355	-910	-1486	10	-4712	486
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173	-299	-693	247	718	-609	-262	-960	603	-29	-494	752	-678	-526	822	843	-517	-563	-190	-4736	367
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-	-15	-12806	-6608	-732	-1329	-5070	-44	*	*											
174	-1758	428	325	1173	-390	120	486	-378	1038	-1869	-1222	44	-342	262	957	-1318	33	-242	-4728	-106
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-	-6	-12797	-8080	-732	-1329	-4235	-79	*	*											
175	-767	188	-179	719	-450	868	853	-765	503	-1815	-635	115	-713	691	60	-698	-565	217	-1295	1093
-	206	979	-178	-352	-36	372	585	-635	438	-130	-677	-164	41	-73	-335	-54	27	-12	-255	-97
-	-21	-12815	-6105	-732	-1329	-4994	-46	*	*											
176	-825	607	570	1090	648	23	341	126	274	-637	-708	-1387	-1236	690	-341	-757	-752	633	-4730	-352
-	206	979	-178	-352	-36	372	585	-635	438	-130	-677	-164	41	-73	-335	-54	27	-12	-255	-97
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177	-1438	537	372	-649	125	-412	-2462	837	-28	-205	392	502	-501	-275	-832	-352	136	1239	-4745	-71
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178	-598	393	1755	-1881	190	-1731	-177	111	-724	-528	341	-445	-904	-1629	-547	-730	131	1609	-1304	73
-	206	979	-178	-352	-36	372	585	-635	438	-130	-677	-164	41	-73	-335	-54	27	-12	-255	97
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179	-478	174	711	-301	-284	-1763	-881	752	-50	-176	920	-1083	-1408	9	219	-976	-1402	1826	-4759	-424
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180	-462	-681	1681	-688	577	-1394	-682	428	-217	-129	-318	-660	-1138	1122	-386	-1296	-1142	655	-966	620
-	206	979	-178	-352	-36	372	585	-635	438	-130	-677	-164	41	-73	-335	-54	27	-12	-255	-97
-	0	-12840	-13840	-732	-1329	-5594	-30	*	*											
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182	-490	609	-3935	-437	1522	-625	-229	551	-1530	280	90	-631	-1644	517	143	-786	656	-179	-1328	1522
-	206	979	-178	-352	-36	372	585	-635	438	-130	-677	-164	41	-73	-335	-54	27	-12	-255	-97
-	-14	-12842	-6719	-732	-1329	-5584	-30	*	*											
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-	206	979	-178	-352	-36	372	585	-635	438	-130	-677	-164	41	-73	-335	-54	27	-12	-255	-97
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-	-15	-12804	-6663	-732	-1329	-5004	-46	*	*											
185	-524	469	-1549	-1597	-422	-1911	661	-432	312	-583	2052	-1183	-1622	878	954	-200	-469	1140	-912	903
-	206	979	-178	-352	-36	372	585	-635	438	-130	-677	-164	41	-73	-335	-54	27	-12	-255	-97
-	0	-12797	-13797	-732	-1329	-5020	-45	*	*											
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-	206	979	-178	-352	-36	372	585	-635	438	-130	-677	-164	41	-73	-335	-54	27	-12	-255	-97
-	-15	-12804	-6659	732	1329	5004	-46	*	*											
187	-1180	979	-502	-617	598	1704	-619	-710	-291	-17	1539	-2582	-1154	240	2381	-1534	473	37	-4728	-113
-	206	979	-178	-352	-36	372	585	-635	438	-130	-677	-164	41	-73	-335	-54	27	-12	-255	-97
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189	-1272	-149	-94	-14	-1679	-787	254	-1992	-1410	-1713	566	-430	-2156	2316	2317	-467	-824	-665	-4728	64
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-	-22	-12797	-6065	-732	-1329	-5675	-29	*	*											
190	-263	-1217	-1747	-745	-2093	-895	-362	-1109	-578	-962	1291	63	-818	1422	2318	-383	387	-1274	-4705	398
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-	-31	-12772	-5581	-732	-1329	-4282	-76	*	*											
191	65	1578	-926	-1317	-582	571	-200	-864	-1156	-1519	645	-440	728	1707	900	-11	-623	-461	-1886	267
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192	368	-823	-2916	-122	183	785	74	-161	-530	-195	1283	-66	-663	882	1069	-618	-746	-360	-4662	-741
-	206	979	-178	-352	-36	372	585	-635	438	-130	-677	-164	41	-73	-335	-54	27	-12	-255	-97
-	0	-12728	-13728	-732	-1329	-4528	-64	*	*											
193	-958	352	-1201	-524	-359	-465	-198	388	-1667	-234	2820	434	432	513	-2904	-772	-833	877	-4681	494
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-	-24	-12747	-5914	-732	-1329	-5401	-35	*	*											
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-	-25	-12694	-5905	-732	-1329	-5846	-25	*	*										
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-	-38	-12665	-5268	-732	-1329	-5883	-25	*	*											
197	-622	175	621	1037	792	-2378	134	-521	-497	-420	-1575	-3163	-440	1966	-1488	100	826	-2449	-1822	343
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198	-292	39	627	1063	559	-2087	17	-215	-1033	-642	217	-2060	-2111	2028	1308	-1079	1033	-1311	-4542	822
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-	-47	-12551	-4979	-732	-1329	-4585	-61	*	*											
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-	-49	-12524	-4917	-732	-1329	-6075	-22	*	*											
201	-684	106	-1377	317	1460	-3389	-976	710	-734	61	-665	-3562	-4115	1800	-975	-1856	-940	-433	-791	2533
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-	-61	-12460	-4607	-732	-1329	-5499	-32	*	*											
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-	-21	-12395	-6157	-732	-1329	-6184	-20	*	*											
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204	-324	536	-3106	-190	1635	-1298	2048	826	-3592	545	-141	-4194	-3989	439	-1096	-3616	-2004	-132	-2462	2459
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205	247	1973	-634	230	-576	-2126	1759	957	3	-229	267	-1893	-3897	775	-999	-1751	-152	252	-4193	1246
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-	-95	-12221	-3980	-732	-1329	-5265	-38	*	*											
206	1101	1339	83	261	217	-1342	1430	458	-3038	10	-1948	-1056	-3821	-1167	-1415	-942	-1030	773	-4116	1668
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207	498	1706	-374	368	-3117	-1673	-216	792	-268	773	475	-1114	-3705	618	-1114	-2160	-517	701	-4000	795
-	206	979	-178	-352	-36	372	585	-635	438	-130	-677	-164	41	-73	-335	-54	27	-12	-255	-97
-	-89	-12005	-4074	-732	-1329	-6464	-16	*	*											
208	773	1555	-1837	441	426	-2180	-2320	658	-190	923	-167	-682	-3601	871	-3346	-1343	-1458	630	-3896	431
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-	-118	-11888	-3676	-732	-1329	-5882	-25	*	*											
209	404	713	-505	1351	-156	-1005	79	-123	-934	1132	-1137	-2301	-1678	-231	-496	-1990	-351	-1409	-3767	1583
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-	-199	-11740	-2960	-732	-1329	-6654	-14	*	*											
210	-573	-1108	-1848	961	783	-389	-56	-1678	-980	1331	-1028	-804	-3196	-347	-2627	-1069	-1088	229	977	2035
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-	-133	-11403	-3515	-732	-1329	-6059	-22	*	*											
211	322	419	-1235	1291	-68	-602	-1900	1273	352	-106	-325	-798	-3081	-654	-606	-790	-483	-978	1748	532
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	-337	-11267	-2266	-732	1329	-6874	-12	*	*											
212	261	1991	75	400	-2856	1005	-1602	363	1325	307	606	-2046	-2780	153	-2225	-2874	-441	879	-64	1462

-	206	979	-178	-352	-36	372	585	-635	438	-130	-677	-164	41	-73	-335	-54	27	-12	-255	-97				
-	-376	-10902	-2127	-732	-1329	-7101	-11	*	*															
213	-1391	-134	-2556	-1361	-505	-364	-532	-745	1830	1361	879	-988	-2337	-662	-834	-732	-231	94	-1315	369				
-	205	983	-180	-350	-37	375	584	-637	440	-131	-677	-163	40	-74	-336	-55	27	-14	-256	98				
-	-4649	-467	-2078	-45	-5027	-7221	-10	*	*															
214	-1223	1924	374	609	-1680	1400	-185	-1465	1380	-1774	-2320	483	-1603	-925	-1978	73	566	-1137	-1858	1740				
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-	-246	-8829	-2695	-732	-1329	-7432	-8	*	*															
215	-1326	-5	-305	976	-1568	1324	-947	-2167	1291	-1662	-2208	455	-1491	-459	-1404	-1586	1851	-1544	-1786	-1628				
-	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*				
-	*	*	*	*	*	*	*	*	0															

//

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HMMER2.0
NAME ras-gap.txt
DESC
LENG  219
ALPH  Amino
RF    no
CS    no
COM   [converted from an old Plan9 HMM]
NSEQ  0
DATE  Mon Mar  8 11:48:16 1999
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NULT       -4  -8455
NULE      595  -1558     85    338   -294    453  -1158    197    249    902  -1085   -142    -21   -313     45    531    201    384  -1998   -644
HMM         A      C      D      E      F      G      H      I      K      L      M      N      P      Q      R      S      T      V      W      Y
          m->m   m->i   m->d   i->m   i->i   d->m   d->d   b->m   m->e
         -3419      *   -142
      1   1128     82   -529  -1249    845   -525   -312    317   -459    116  -1573  -1061   -856    824  -1232   -951   1263   -909    854   -993
      -    206    979   -178   -352    -36    372    585   -635    438   -130   -677   -164     41    -73   -335    -54     27    -12   -255    -97
      -     -7  -8376  -9376   -732  -1329  -3001   -193  -3419      *
      2   -815    -42    501  -1373    714    414   1587  -1656   -583   -281  -1698  -1185   -981    703   1367    516   -995  -1033   2041  -1118
      -    206    979   -178   -352    -36    372    585   -635    438   -130   -677   -164     41    -73   -335    -54     27    -12   -255    -97
      -     -6  -8593  -9593   -732  -1329  -3739   -112      *      *
      3    402    -65    364    446    393   -672   -459  -1680   -606   -275   1287    847  -1004  -1117   -771  -1098    382    304    407   1011
      -    206    979   -178   -352    -36    372    585   -635    438   -130   -677   -164     41    -73   -335    -54     27    -12   -255    -97
      -      5  -8631  -9631   -732  -1329   3000   -193      *      *
      4    369    160    574   1921  -1175    347    152  -1774   -701    610  -1815  -1303  -1098   -125  -1474   1193  -1112  -1151   1394    559
      -    206    979   -178   -352    -36    372    585   -635    438   -130   -677   -164     41    -73   -335     54     27    -12   -255     97
      -      5  -8782  -9782   -732  -1329  -2631   -254      *      *
      5    314   -281    957   -164    482   -888   -675  -1896   -823    280  -1937  -1425  -1220  -1333    221    784  -1234    863    821    716
      -    206    979   -178   -352    -36    372    585   -635    438   -130   -677   -164     41    -73   -335    -54     27    -12   -255    -97
      -     -4  -8968  -9968   -732  -1329  -2449   -292      *      *
      6    654   -395    643  -1727  -1411   -129   1474  -2010    371    917  -2051    216  -1334  -1447     93  -1429     94    717  -1629  -1471
      -    206    979   -178   -352    -36    372    585   -635    438   -130   -677   -164     41    -73   -335    -54     27    -12   -255    -97
      -      4  -9133 -10133   -732  -1329  -3139   -174      *      *
      7    984   -420   -680    169  -1435     89    817    125   -961    654  -2076  -1563  -1359  -1472    885    284  -1373    348  -1654   -735
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      -    206    979   -178   -352    -36    372    585   -635    438   -130   -677   -164     41    -73   -335    -54     27    -12   -255    -97
      -     -4  -9168 -10168   -732  -1329  -2641   -252      *      *
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      -    206    979   -178   -352    -36    372    585   -635    438   -130   -677   -164     41    -73   -335    -54     27    -12   -255    -97
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65	24	-619	154	511	-1634	-1226	1824	-199	1429	-383	788	-1763	1556	987	-1088	241	398	1611	1680	1031			
	206	979	178	352	-36	372	565	635	438	-130	-677	-164	-41	73	-335	-54	27	12	255	97			
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	206	979	-178	352	-36	372	585	-635	438	-130	-677	-164	41	-73	-335	-54	27	12	255	97			
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69	-876	-652	909	1984	-1668	387	1179	-789	206	765	685	-1796	-97	109	-1264	523	48	106	-1887	-666			
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70	-872	-711	38	372	-1726	-148	-1105	-406	540	1416	-2367	-1854	970	-874	-2025	210	-40	-1297	999	-1787			
	206	979	-178	352	-36	372	585	-635	438	-130	-677	-164	41	-73	-335	-54	27	-12	-255	-97			
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71	215	270	653	2042	1008	-1318	-1105	1140	-66	-21	-2367	119	-52	856	618	-100	-1333	-633	-1945	-1787			
	206	979	-178	352	-36	372	585	-635	438	-130	-677	-164	41	-73	-335	-54	27	-12	-255	-97			
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72	1439	1358	-1824	161	-1069	-401	568	1222	-1207	999	-2322	-52	1331	-1718	-276	-1699	-1618	538	1439	-1742			
	206	979	-178	-352	-36	372	585	-635	438	-130	-677	-164	41	-73	-335	-54	27	-12	-255	-97			
	-82	-9521	4206	732	-1329	-3028	-189	*	*														
73	-1382	-609	-520	1201	-1624	-1216	1101	1163	459	135	-2265	180	-1547	-1661	-425	70	-1561	1114	-1843	-1685			
	206	979	-178	-352	-36	372	585	-635	438	-130	-677	-164	41	-73	-335	-54	27	-12	-255	-97			
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74	-262	-655	329	831	-1671	-1263	-1050	1005	647	296	-2311	1207	-1594	198	-1432	-681	-193	163	-1889	-1731			
	206	979	-178	-352	-36	372	585	-635	438	-130	-677	-164	41	-73	-335	-54	27	-12	-255	-97			
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75	-244	-595	628	-328	-141	-1202	-989	961	173	-91	316	238	-1533	-112	-886	-271	-931	1463	-1829	-1671			
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76	-37	779	-1810	873	-651	181	-1047	-12	319	21	1170	-301	191	-1705	-1967	-8	468	220	-1887	-426			
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77	1111	-711	-1378	1266	-1726	-1318	974	548	1314	-1820	-2367	-855	-115	229	-1447	566	98	857	-1945	-1787			
	206	979	-178	-352	-36	372	585	-635	438	-130	-677	-164	41	-73	-335	-54	27	-12	-255	-97			
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	206	979	-178	-352	-36	372	585	-635	438	-130	-677	-164	41	-73	-335	-54	27	-12	-255	-97			
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-	206	979	178	352	-36	372	585	-635	438	-130	-677	-164	41	-73	335	-54	27	12	-255	-97					
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94	-965	-781	-1939	562	-1796	919	-1175	237	1345	7	-2437	309	-220	-121	-1064	-17	-1734	-445	-2015	1262					
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	206	979	178	352	-36	372	585	-635	438	-130	-677	-164	41	-73	-335	-54	27	12	-255	-97					
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110	-308	1549	-888	-8	2370	-1698	-1485	-719	383	-770	-2747	-2235	544	-1033	-30	217	-300	117	-2325	-10					
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	206	979	178	352	-36	372	585	-635	438	-130	-677	-164	41	-73	-335	-54	27	-12	-255	-97					
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113	-14	-1053	390	102	1006	-1660	-486	-178	-1594	-298	-2709	941	-1992	2350	-2367	-705	-437	207	-2287	-43					
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114	-69	-1091	-2249	576	1019	-631	454	-777	317	1471	257	-658	-766	-2143	131	-820	-153	-279	1583	-2167					
	206	979	-178	352	-36	372	585	-635	438	-130	-677	-164	41	-73	-335	-54	27	-12	-255	-97					
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115	-798	942	99	790	-183	-1698	-235	992	-305	420	-2747	-1661	-766	-2143	2210	-682	-277	115	-2325	-2167					
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116	-425	-1091	182	-2422	842	-844	-1485	870	-228	-924	-2747	-2235	-493	-629	87	1963	-662	354	-2325	-2167					
	206	979	178	352	-36	372	585	-635	438	-130	-677	-164	41	-73	-335	-54	27	-12	-255	-97					
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-	-2	-10125	11125	732	1329	-76	-4293	*	*											
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-	122	-10125	3636	-732	-1329	-76	-4293	*	*											
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-	206	979	-178	-352	-36	372	585	-635	438	-130	-677	-164	41	-73	-335	-54	27	-12	-255	-97
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-	206	979	178	-352	-36	372	585	-635	438	-130	-677	-164	41	-73	-335	-54	27	-12	-255	-97
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-	206	979	-178	-352	-36	372	585	-635	*	438	-130	-677	-164	41	-73	-335	-54	27	-12	-255	-97				
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149	-1218	-451	-1715	902	1297	-1164	-952	456	-191	-1025	-503	-1701	-1496	-1609	2639	-1591	-1510	-90	-1791	-1633					
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	56	9443	-4780	-732	-1329	-2538	-273	*	*																
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NULE      595  -1558     85    338   -294    453  -1158    197    249    902  -1085   -142    -21   -313     45    531    201    384  -1998   -644
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     1     718   -375    493  -1368    843   -982  -1403   -203   -358   -487  -1237   -480  -1005    144   -420  -1125   -856   1123   -645   1899
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     -     -74 -12898  -4334   -732  -1329  -1713   -525      *      *
     3    1031  -1833    760   -574      8  -1164  -1006    -93     84   -346  -5272  -1422   -936  -1159    898  -1387    237    589  -1714   1339
     -     206    979   -178   -352    -36    372    585   -635    438   -130   -677   -164     41    -73   -335    -54     27    -12   -255    -97
     -     -85 -12925  -4125   -732  -1329  -2368   -311      *      *
     4    1304   -402   1281   -232   -742   -573  -1045  -2587   -814    823  -1455   -328  -2448  -1750  -1443  -1309    137   -149   -775   1408
     -     206    979   -178   -352    -36    372    585   -635    438   -130   -677   -164     41    -73   -335    -54     27    -12   -255    -97
     -     -39 -12900  -5250   -732  -1329  -2560   -268      *      *
     5    -661  -1289    802   -320    348  -1315   -510    -44    -76    734   -290    491   -316   -755   -520  -1086   -797   -589   -789   2126
     -     206    979   -178   -352    -36    372    585   -635    438   -130   -677   -164     41    -73   -335    -54     27    -12   -255    -97
     -     -45 -12917  -5019   -732  -1329  -3105   -178      *      *
     6    -182  -3597   1242    315   1420  -1246   -808   -819   -847   -501   -726   -581  -1886   -280   -515   -620   -940    -33  -1223   2430
     -     206    979   -178   -352    -36    372    585   -635    438   -130   -677   -164     41    -73   -335    -54     27    -12   -255    -97
     -     -30 -12905  -5631   -732  -1329  -3779   -109      *      *
     7    -129  -1040   1817      3    -96   -155    494  -1600   -933   -748  -1640   -911    118    121   -502   -494   -347  -1471  -1677   2193
     -     206    979   -178   -352    -36    372    585   -635    438   -130   -677   -164     41    -73   -335    -54     27    -12   -255    -97
     -     -27 -12892  -5789   -732  -1329  -2044   -401      *      *
     8    -448    742    765   1337   1077   -348  -2262  -1424   -469  -1082  -2593  -1518    -54    266  -1385   -959   -662  -1237    234   2343
     -     206    979   -178   -352    -36    372    585   -635    438   -130   -677   -164     41    -73   -335    -54     27    -12   -255    -97
     -     -97 -12953  -3945   -732  -1329  -1727   -519      *      *
     9     639  -1107   1330    291   -531   -504  -1506   -636  -1249   -780   -581    537   -204    737   -626    380    414  -1110    134   -422
     -     206    979   -178   -352    -36    372    585   -635    438   -130   -677   -164     41    -73   -335    -54     27    -12   -255    -97
     -     -45 -12947  -5028   -732  -1329  -2552   -270      *      *
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10	566	-3641	865	237	-236	308	-403	-1219	-117	-362	-3101	-1972	723	207	561	190	-395	-927	209	97
-	206	979	-178	-352	-36	372	585	-635	438	-130	-677	-164	41	-73	-335	-54	27	-12	-255	-97
-	-50	-12951	-4876	-732	-1329	-2775	-228	*	*											
11	-140	-1857	1202	862	-1453	-224	245	-332	-496	-117	-897	526	-1402	299	-720	224	910	-1165	-439	-2026
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-	-85	-12941	-4138	-732	-1329	-3067	-183	*	*											
12	-413	-3583	1081	1236	143	162	-1255	-248	305	-445	-1277	395	228	81	-236	-227	-404	-2094	963	-4659
-	206	979	-178	-352	-36	372	585	-635	438	-130	-677	-164	41	-73	-335	-54	27	-12	-255	-97
-	-175	-12890	-3129	-732	-1329	-3565	-127	*	*											
13	-1441	-725	1690	780	-68	488	-1771	-59	-222	-1062	-381	-187	-101	48	-284	-69	-485	-626	1584	-1355
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-	-162	-12744	-3238	-732	-1329	-2321	-322	*	*											
14	-2299	-29	1889	709	-547	91	-1308	-538	432	-227	-2413	736	-152	-1269	-823	-240	-140	-704	295	-677
-	206	979	-178	-352	-36	372	585	-635	438	-130	-677	-164	41	-73	-335	-54	27	-12	-255	-97
-	-92	-12691	-4027	-732	-1329	-3352	-149	*	*											
15	-444	460	-178	1905	-1254	582	695	-505	553	-274	-5011	-670	-1375	-852	-162	-250	-1303	-502	322	-1160
-	202	974	-172	-344	-34	374	582	-629	436	-128	-674	-166	41	-76	-334	-57	24	-12	-249	-100
-	-7053	-189	-3116	-5	-8135	-2391	-305	*	*											
16	-1570	-1581	682	1280	-919	-277	-1038	-302	-17	-4	-529	-830	1054	204	168	-608	-845	457	364	-1771
-	203	976	-174	-349	-35	369	583	-631	441	-127	-674	-166	37	-71	-334	-55	25	-11	-256	-101
-	-6940	-144	-3526	-5	-8326	-1744	-511	*	*											
17	-1388	-1755	1474	30	-445	540	-569	-637	-111	770	-458	-294	-2339	465	-1226	70	114	-388	341	-1275
-	206	979	-178	-352	-36	372	585	-635	438	-130	-677	-164	41	-73	-335	-54	27	-12	-255	-97
-	-16	-12791	-6501	-732	-1329	-2694	-242	*	*											
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-	206	979	-178	-352	-36	372	585	-635	438	-130	-677	-164	41	-73	-335	-54	27	-12	-255	-97
-	-11	-12850	-7086	-732	-1329	-1571	-592	*	*											
19	-2782	-2336	-942	-242	435	50	-487	198	395	1500	-1367	-425	-3233	-598	-839	719	-453	-298	1064	-1560
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-	-16	-12980	-6485	-732	-1329	-1880	-457	*	*											
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-	-24	-13023	-5937	-732	-1329	-1194	-829	*	*											
21	-1964	-1241	45	385	1707	394	422	39	956	293	-452	-4	-1840	-540	-13	-1063	-300	-1262	285	-1002
-	206	979	-178	-352	-36	372	585	-635	438	-130	-677	-164	41	-73	-335	-54	27	-12	-255	-97
-	-9	-13093	-7334	-732	-1329	-1982	-421	*	*											
22	-741	-1256	681	701	-1256	551	301	-169	1541	-1443	367	198	-2671	261	240	-464	-1044	-556	1095	-2407
-	206	979	-178	-352	-36	372	585	-635	438	-130	-677	-164	41	-73	-335	-54	27	-12	-255	-97
-	-36	-13114	-5367	-732	-1329	-2132	-374	*	*											
23	-1599	-2013	212	684	-34	1160	-166	192	1083	-906	-1324	-112	-419	-331	23	-816	-432	-640	1520	-687
-	206	979	-178	-352	-36	372	585	-635	438	-130	-677	-164	41	-73	-335	-54	27	-12	-255	-97
-	-18	-13101	-6348	-732	-1329	-1648	-555	*	*											
24	-2667	-771	699	1276	-1328	1543	-801	-310	823	-430	-1065	470	-3375	-474	-838	-1483	-1196	-437	1815	-1704
-	206	979	-178	-352	-36	372	585	-635	438	-130	-677	-164	41	-73	-335	-54	27	-12	-255	-97

-	-13	-13121	-6785	-732	-1329	-2843	-216	*	*										
25	-978	-7	1784	712	-200	91	-430	-700	739	-476	-1131	-1328	-1275	312	128	-1592	-282	-784	1707	-273
-	206	979	-178	-352	-36	372	585	-635	438	-130	-677	-164	41	-73	-335	-54	27	-12	-255	-97
-	-31	-13117	-5562	-732	-1329	-2575	-265	*	*											
26	-1780	767	389	74	551	-1	221	864	-844	415	-523	220	-1845	-233	-395	-1039	-638	544	2020	-505
-	206	979	-178	-352	-36	372	585	-635	438	-130	-677	-164	41	-73	-335	-54	27	-12	-255	-97
-	-31	-13099	-5541	-732	-1329	-2274	-334	*	*											
27	-1328	-819	276	-638	-1509	-121	275	1175	-946	473	-145	285	-2186	579	-519	-1818	-639	652	2639	312
-	206	979	-178	-352	-36	372	585	-635	438	-130	-677	-164	41	-73	-335	-54	27	-12	-255	-97
-	-36	-13090	-5338	-732	-1329	-2835	-218	*	*											
28	-966	-736	48	283	-144	-783	816	1073	-5	148	-1452	-543	-1527	229	-200	-1705	124	522	2551	-733
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-	-41	-13067	-5153	-732	-1329	-2183	-359	*	*											
29	-951	-330	-218	448	-1195	-229	-967	1395	-367	246	-2820	421	-900	-839	-470	-576	-270	899	1444	-806
-	206	979	-178	-352	-36	372	585	-635	438	-130	-677	-164	41	-73	-335	-54	27	-12	-255	-97
-	-34	-13058	-5429	-732	-1329	-2427	-297	*	*											
30	-806	-373	92	557	-2415	70	-265	884	325	205	-2065	943	-1074	-1204	-300	-756	151	-195	2070	-959
-	206	979	-178	-352	-36	372	585	-635	438	-130	-677	-164	41	-73	-335	-54	27	-12	-255	-97
-	-52	-13052	-4835	-732	-1329	-2474	-286	*	*											
31	-1196	-3713	680	1140	-2098	-138	-934	-74	225	-629	-1238	1605	-1763	-350	-32	30	-379	-1613	2336	-252
-	206	979	-178	-352	-36	372	585	-635	438	-130	-677	-164	41	-73	-335	-54	27	-12	-255	-97
-	-134	-13025	-3498	-732	-1329	-2148	-369	*	*											
32	-1249	-1301	544	-66	-724	6	916	-968	1214	-1212	139	947	-958	-251	93	-164	292	-881	2114	-164
-	206	979	-178	-352	-36	372	585	-635	438	-130	-677	-164	41	-73	-335	-54	27	-12	-255	-97
-	-100	-12934	-3898	-732	-1329	-1813	-483	*	*											
33	-1043	-715	428	726	-3421	772	-526	-992	99	-1275	-5267	1141	-336	425	-1018	477	-790	-396	2130	713
-	206	979	-178	-352	-36	372	585	-635	438	-130	-677	-164	41	-73	-335	-54	27	-12	-255	-97
-	-57	-12919	-4686	-732	-1329	-2249	-341	*	*											
34	-888	-3610	1163	1013	-1942	970	-860	-1244	155	-1764	-3158	951	-1410	-7	-893	-357	-519	-732	3099	-928
-	206	979	-178	-352	-36	372	585	-635	438	-130	-677	-164	41	-73	-335	-54	27	-12	-255	-97
-	-58	-12917	-4674	-732	-1329	-3139	-174	*	*											
35	-2210	-39	1675	680	-1088	437	-845	-1296	-339	-1448	-2215	957	-922	-540	-863	-845	-537	-751	3469	145
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-	-111	-12890	-3759	-732	-1329	-3237	-162	*	*											
36	-969	-421	660	9	-1652	799	57	-1789	523	-1163	-2424	430	153	-327	-709	-1646	-985	-1873	4023	492
-	206	979	-178	-352	-36	372	585	-635	438	-130	-677	-164	41	-73	-335	-54	27	-12	-255	-97
-	-40	-12808	-5195	-732	-1329	-2538	-273	*	*											
37	-307	581	-126	-1199	-2219	357	-489	-924	-314	-991	-3286	310	-1040	-599	-371	-714	-1575	-502	4725	-1607
-	206	979	-178	-352	-36	372	585	-635	438	-130	-677	-164	41	-73	-335	-54	27	-12	-255	-97
-	-63	-12845	-4556	-732	-1329	-2219	-349	*	*											
38	-293	468	-1141	288	-795	885	82	-906	-390	-389	-1303	-978	-1308	14	-263	-571	-613	-929	4095	-527
-	183	945	-194	-334	-53	402	558	-630	427	-149	-699	-125	41	-67	-304	-60	28	-5	-190	-79
-	-7272	-26	-6489	-3189	-168	-4202	-81	*	*											
39	-790	688	-894	283	-2040	1882	-1134	-261	202	-2763	-5071	401	250	1048	204	-1100	-1673	176	-4649	67

-	206	979	-178	-352	-36	372	585	-635	438	-130	-677	-16.	41	-73	-335	-54	27	-12	-255	-97
-	-106	-12714	-3819	-732	-1329	-3334	-151	*	*											
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-	-47	-12660	-4971	-732	-1329	-3649	-120	*	*											
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-	206	979	-178	-352	-36	372	585	-635	438	-130	-677	-164	41	-73	-335	-54	27	-12	-255	-97
-	-53	-12634	-4796	-732	-1329	-5023	-45	*	*											
42	-3074	-2541	-2946	-2462	611	1802	-3685	353	-578	-1646	-1285	-445	1390	120	-13	-1481	-2266	488	366	1804
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-	-106	-12583	-3828	-732	-1329	-5903	-24	*	*											
43	-1483	-3176	-4334	-430	574	-62	276	1278	-297	-85	413	-1907	1406	-971	-956	-109	-1327	485	1315	888
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-	-62	-12461	-4587	-732	-1329	-6067	-22	*	*											
44	-140	-3108	-2739	-1131	1879	86	-430	917	-953	-1870	-1067	1110	1756	-2435	-2764	-149	-2192	463	-1108	-355
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-	-49	-12267	-4909	-732	-1329	-6259	-19	*	*											
46	-188	-763	-3594	-649	735	-2076	-212	-169	-1175	-1040	-4598	1560	846	-2246	-1045	886	-852	955	-4176	1696
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-	-135	-12208	-3491	-732	-1329	-6317	-18	*	*											
47	27	-2785	-3943	165	-513	-3099	-3180	-686	-839	-2147	-1586	1592	1680	-1083	-743	-789	-166	929	193	2062
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-	-167	-12037	-3197	-732	-1329	-6443	-17	*	*											
48	714	-2600	-3758	131	105	-1083	19	-1570	-260	-994	-4256	-386	-51	-495	550	-1167	-669	1291	-3834	2401
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-	-207	-11832	-2906	-732	-1329	-5625	-30	*	*											
49	886	-2396	-3554	341	-2928	-3003	-853	-797	819	-68	-1165	1077	-354	-2471	-1028	-2186	-1061	1649	-3630	1539
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-	-372	-11600	-2140	-732	-1329	-6737	-14	*	*											
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-	-750	-11212	-1305	-732	-1329	-7041	-11	*	*											
51	-1960	-1456	-1514	2048	-2471	-1381	-1850	-1081	367	249	-120	-907	902	-735	-127	-2489	-2409	1487	-550	-1051
-	205	979	-179	-351	-37	371	584	-636	440	-131	-674	-165	40	-68	-333	-55	26	-13	-251	-96
-	-4917	-757	-1414	-59	-4637	-5989	-23	*	*											
52	-991	-447	-1178	679	-1462	-1054	-841	-54	2381	-394	-1085	-1590	-1386	-1499	1637	-1480	-1399	-1438	-1681	65
-	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*
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//

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ALPH  Amino
RF    no
CS    no
COM   [converted from an old Plan9 HMM]
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DATE  Mon Mar  8 11:48:46 1999
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NULT       -4  -8455
NULE      595  -1558     85    338   -294    453  -1158    197    249    902  -1085   -142    -21   -313     45    531    201    384  -1998   -644
HMM         A      C      D      E      F      G      H      I      K      L      M      N      P      Q      R      S      T      V      W      Y

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         -2130      *   -374
      1    616    114  -1044  -1217   -901   1619   -280  -1500   -427   -995  -1542  -1029   2338   -938  -1200   -919   -839   -877  -1120   -962
      -    206    979   -178   -352    -36    372    585   -635    438   -130   -677   -164     41    -73   -335    -54     27    -12   -255    -97
      -     -7  -8319  -9319   -732  -1329  -2149   -369  -2130      *
      2   -526   -109  -1266   2104  -1124   1390   -503  -1723   -650  -1218  -1764  -1252   1356  -1161  -1423   -306  -1061   -930  -1343  -1184
      -    206    979   -178   -352    -36    372    585   -635    438   -130   -677   -164     41    -73   -335    -54     27    -12   -255    -97
      -     -5  -8717  -9717   -732  -1329  -1067   -936      *      *
      3    159   -517  -1675   2000  -1532   1317   -911  -2132  -1059  -1627  -2173    386  -1456  -1569   -622   1304  -1470  -1509  -1751  -1593
      -    206    979   -178   -352    -36    372    585   -635    438   -130   -677   -164     41    -73   -335    -54     27    -12   -255    -97
      -     -3  -9358 -10358   -732  -1329   -544  -1672      *      *
      4   1110   -789   1383   1430  -1804  -1396  -1183  -2403  -1330  -1898  -2445  -1932   -892  -1841    524   1375  -1741  -1144   1688  -1865
      -    206    979   -178   -352    -36    372    585   -635    438   -130   -677   -164     41    -73   -335    -54     27    -12   -255    -97
      -     -3  -9734 -10734   -732  -1329   -317  -2343      *      *
      5  -1324   -892   1395    940  -1907   1103  -1286  -2506  -1433  -2001  -2547   1527  -1830  -1944  -2206    986    978   -707  -2126  -1968
      -    206    979   -178   -352    -36    372    585   -635    438   -130   -677   -164     41    -73   -335    -54     27    -12   -255    -97
      -     -2  -9870 -10870   -732  -1329   -734  -1327      *      *
      6    172   -892  -2049   -386  -1907   1968  -1286  -2506  -1433  -2001  -2547   1803  -1830  -1944  -2206    987    785  -1006    735  -1968
      -    206    979   -178   -352    -36    372    585   -635    438   -130   -677   -164     41    -73   -335    -54     27    -12   -255    -97
      -     -2  -9870 -10870   -732  -1329    -47  -4951      *      *
      7     62   -928   -822   1012  -1007   1369  -1322  -2542  -1469  -2037  -2583  -2071    561  -1980  -2242   1942   -358   -529  -2162  -1036
      -    206    979   -178   -352    -36    372    585   -635    438   -130   -677   -164     41    -73   -335    -54     27    -12   -255    -97
      -     -2  -9917 -10917   -732  -1329    -76  -4293      *      *
      8    326    150  -1624   2073  -1943   1531  -1322  -2542  -1469  -2037  -2583  -2071  -1866  -1980    140   1240  -1880   -720  -2162  -2004
      -    206    979   -178   -352    -36    372    585   -635    438   -130   -677   -164     41    -73   -335    -54     27    -12   -255    -97
      -     -2  -9917 -10917   -732  -1329    -76  -4293      *      *
      9    985   -928  -2085   1725  -1943  -1535  -1322  -2542  -1469  -2037  -2583  -2071   -276    798    389   1755  -1880   -131  -2162  -2004
      -    206    979   -178   -352    -36    372    585   -635    438   -130   -677   -164     41    -73   -335    -54     27    -12   -255    -97
      -     -2  -9917 -10917   -732  -1329    -76  -4293      *      *
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10	-751	-928	1378	1746	-1943	1652	-1322	-2542	-1469	-2037	-2583	-2071	-1866	-1560	-2242	1013	380	-1919	-2162	-1175
-	206	979	-178	-352	-36	372	585	-635	438	-130	-677	-164	41	-73	-335	-54	27	-12	-255	-97
-	-2	-9917	-10917	-732	-1329	-76	-4293	*	*											
11	1484	-928	-2085	-2259	-1943	1103	-1322	-2542	-1469	-2037	-2583	1825	-1866	-1980	-2242	1195	813	-909	-2162	-76
-	206	979	-178	-352	-36	372	585	-635	438	-130	-677	-164	41	-73	-335	-54	27	-12	-255	-97
-	-118	-9917	-3684	-732	-1329	-76	-4293	*	*											
12	-1611	-837	-1995	1458	629	1067	-1232	-2452	-1379	-1947	-2493	-1981	774	-1889	-2152	1793	-1215	283	-2071	-334
-	206	979	-178	-352	-36	372	585	-635	438	-130	-677	-164	41	-73	-335	-54	27	-12	-255	-97
-	-2	-9798	-10798	-732	-1329	-1303	-750	*	*											
13	-42	334	-1817	2076	-1853	1822	-1232	-2452	-1379	-1947	-2493	-1981	-366	-1889	180	712	-1790	-955	-2071	-1913
-	206	979	-178	-352	-36	372	585	-635	438	-130	-677	-164	41	-73	-335	-54	27	-12	-255	-97
-	-2	-9798	-10798	-732	-1329	-32	-5520	*	*											
14	1104	-928	-2085	1595	-1943	-1535	-1322	-2542	-1469	-2037	-2583	-2071	-41	-1980	389	2231	-1880	-1564	-2162	-2004
-	206	979	-178	-352	-36	372	585	-635	438	-130	-677	-164	41	-73	-335	-54	27	-12	-255	-97
-	-2	-9917	-10917	-732	-1329	-76	-4293	*	*											
15	-1701	-928	1341	1352	-1943	1456	-1322	-2542	-1469	-2037	-2583	639	-1866	-1432	-2242	1255	380	-1919	-2162	-110
-	206	979	-178	-352	-36	372	585	-635	438	-130	-677	-164	41	-73	-335	-54	27	-12	-255	-97
-	-2	-9917	-10917	-732	-1329	-76	-4293	*	*											
16	-891	-928	-605	-2259	-1943	1149	-1322	-2542	-1469	-2037	-2583	2125	1375	-1980	-2242	1433	-68	-349	-2162	-515
-	206	979	-178	-352	-36	372	585	-635	438	-130	-677	-164	41	-73	-335	-54	27	-12	-255	-97
-	-2	-9917	-10917	-732	-1329	-76	-4293	*	*											
17	-1701	-928	-2085	1353	-478	1550	-1322	-2542	-1469	-2037	-2583	33	937	-1980	-2242	1869	-1692	-1919	-2162	70
-	206	979	-178	-352	-36	372	585	-635	438	-130	-677	-164	41	-73	-335	-54	27	-12	-255	-97
-	-2	-9917	-10917	-732	-1329	-76	-4293	*	*											
18	-71	350	-2085	1975	-1943	1780	-1322	-2542	-1469	-2037	-2583	-2071	-819	-1980	17	1240	-1880	-909	-2162	-2004
-	206	979	-178	-352	-36	372	585	-635	438	-130	-677	-164	41	-73	-335	-54	27	-12	-255	-97
-	-2	-9917	-10917	-732	-1329	-76	-4293	*	*											
19	698	-928	-2085	1988	-1943	-209	-1322	-2542	-1469	-2037	-2583	-2071	101	-1980	389	1755	-1880	-1509	-2162	392
-	206	979	-178	-352	-36	372	585	-635	438	-130	-677	-164	41	-73	-335	-54	27	-12	-255	-97
-	-2	-9917	-10917	-732	-1329	-76	-4293	*	*											
20	136	-928	1239	1707	-1943	1529	-1322	-2542	-1469	-2037	-2583	-2071	-1866	-109	-2242	803	380	-1919	-2162	-2004
-	206	979	-178	-352	-36	372	585	-635	438	-130	-677	-164	41	-73	-335	-54	27	-12	-255	-97
-	-2	-9917	-10917	-732	-1329	-76	-4293	*	*											
21	-1596	-928	-979	-2259	-1943	1120	-1322	-2542	-1469	-2037	-2583	1679	1715	186	-2242	1706	-68	-1919	-2162	-329
-	206	979	-178	-352	-36	372	585	-635	438	-130	-677	-164	41	-73	-335	-54	27	-12	-255	-97
-	-2	-9917	-10917	-732	-1329	-76	-4293	*	*											
22	-1360	-928	-2085	1353	164	1658	-1322	-2542	-1469	-2037	-2583	-2071	561	-1980	-2242	1974	-433	-1919	-2162	-2004
-	206	979	-178	-352	-36	372	585	-635	438	-130	-677	-164	41	-73	-335	-54	27	-12	-255	-97
-	-46	-9917	-5050	-732	-1329	-76	-4293	*	*											
23	-451	883	-1795	2007	-1909	1510	-1288	-2508	-1435	-2003	-2550	-2037	-634	-1946	230	1275	-133	-1885	-2128	-1970
-	206	979	-178	-352	-36	372	585	-635	438	-130	-677	-164	41	-73	-335	-54	27	-12	-255	-97
-	-2	-9873	-10873	-732	-1329	-690	-1395	*	*											
24	940	-894	668	1629	-1909	-1501	-1288	-2508	-1435	584	-2550	-2037	-479	-1946	422	1235	-1847	-1512	-2128	-1970
-	206	979	-178	-352	-36	372	585	-635	438	-130	-677	-164	41	-73	-335	-54	27	-12	-255	-97

-	-2	-9873	-10873	-732	-1329	-49	-4908	*	*										
25	-1701	-928	1120	1624	-1943	1328	-1322	-2542	-1469	-2037	-2583	1228	-1866	-1980	-2242	1188	380	-1919	-2162	-2004
-	206	979	-178	-352	-36	372	585	-635	438	-130	-677	-164	41	-73	-335	-54	27	-12	-255	-97
-	-2	-9917	-10917	-732	-1329	-76	-4293	*	*											
26	865	-928	-822	-2259	-1943	1663	-1322	-2542	-1469	-2037	-2583	1837	-1866	-1980	-2242	1712	-68	-1919	-2162	-2004
-	206	979	-178	-352	-36	372	585	-635	438	-130	-677	-164	41	-73	-335	-54	27	-12	-255	-97
-	-2	-9917	-10917	-732	-1329	-76	-4293	*	*											
27	-751	-928	-2085	1353	-1105	1748	-1322	-2542	-1469	-2037	-2583	-2071	679	-1980	-2242	2055	-1718	-1919	-2162	-2004
-	206	979	-178	-352	-36	372	585	-635	438	-130	-677	-164	41	-73	-335	-54	27	-12	-255	-97
-	-2	-9917	-10917	-732	-1329	-76	-4293	*	*											
28	113	1312	-2085	1975	-1943	1313	-1322	-2542	-1469	-2037	-2583	-2071	-457	-1980	235	1514	-1880	-1919	-2162	-2004
-	206	979	-178	-352	-36	372	585	-635	438	-130	-677	-164	41	-73	-335	-54	27	-12	-255	-97
-	-2	-9917	-10917	-732	-1329	-76	-4293	*	*											
29	929	-928	-2085	2431	-1943	-1535	-1322	-2542	-1469	-2037	-2583	-2071	-644	-1980	389	1628	-1880	-1510	-2162	-2004
-	206	979	-178	-352	-36	372	585	-635	438	-130	-677	-164	41	-73	-335	-54	27	-12	-255	-97
-	-233	-9917	-2753	-732	-1329	-76	-4293	*	*											
30	-174	-733	1842	1729	-1748	-44	-1127	-2348	-1275	-1843	-2389	862	-1672	-1328	-2047	782	570	-1725	-1967	-1809
-	206	979	-178	-352	-36	372	585	-635	438	-130	-677	-164	41	-73	-335	-54	27	-12	-255	-97
-	-158	-9600	-3284	-732	-1329	-1766	-502	*	*											
31	397	-620	-1777	462	-1635	653	-1014	-2234	-1161	-1729	-2275	2294	-1558	-1672	-1934	1871	-1572	-1611	-1854	-1696
-	206	979	-178	-352	-36	372	585	-635	438	-130	-677	-164	41	-73	-335	-54	27	-12	-255	-97
-	-3	-9451	-10451	-732	-1329	-2338	-318	*	*											
32	-1393	-620	-1777	-98	-1121	1847	-1014	-2234	-1161	-1729	-2275	-1763	1330	-1672	-1934	1883	-1198	-1611	-1854	862
-	206	979	-178	-352	-36	372	585	-635	438	-130	-677	-164	41	-73	-335	-54	27	-12	-255	-97
-	-3	-9451	-10451	-732	-1329	-1536	-610	*	*											
33	-467	786	-1666	1335	-1690	1757	-1069	-2289	-1216	-1784	-2331	-1818	267	-1727	520	1222	-1627	-175	-1909	-1751
-	206	979	-178	-352	-36	372	585	-635	438	-130	-677	-164	41	-73	-335	-54	27	-12	-255	-97
-	-144	-9525	-3418	-732	-1329	-2100	-383	*	*											
34	598	-572	-1577	1953	-1587	-1179	-966	-2186	-1113	-1681	-2228	-1715	1051	-1624	745	1481	-1525	-1055	-1806	-1648
-	206	979	-178	-352	-36	372	585	-635	438	-130	-677	-164	41	-73	-335	-54	27	-12	-255	-97
-	-3	-9385	-10385	-732	-1329	-2453	-291	*	*											
35	525	-572	993	1886	-1587	864	-966	-2186	-1113	-1351	-2228	391	-1511	-1624	-1886	1026	-1342	-1563	-1806	-1648
-	206	979	-178	-352	-36	372	585	-635	438	-130	-677	-164	41	-73	-335	-54	27	-12	-255	-97
-	-3	-9385	-10385	-732	-1329	-2453	-291	*	*											
36	-1345	-572	-1730	-1690	-1587	680	-251	-2186	-1113	-699	-2228	2384	322	-1624	-1886	1888	-1525	-318	-1806	-1648
-	206	979	-178	-352	-36	372	585	-635	438	-130	-677	-164	41	-73	-335	-54	27	-12	-255	-97
-	-3	-9385	-10385	-732	-1329	-2453	-291	*	*											
37	-1021	-572	-1730	-46	790	1956	-966	-2186	-1113	-1681	-2228	-1715	150	-1624	-221	1843	-860	-1563	-1806	-1648
-	206	979	-178	-352	-36	372	585	-635	438	-130	-677	-164	41	-73	-335	-54	27	-12	-255	-97
-	-208	-9385	-2915	-732	-1329	-2453	-291	*	*											
38	-88	-429	-1587	790	-1444	1696	-823	-2044	-971	-1539	-2085	-1573	371	-1481	803	1218	-1382	86	-1663	-1505
-	206	979	-178	-352	-36	372	585	-635	438	-130	-677	-164	41	-73	-335	-54	27	-12	-255	-97
-	-398	-9185	-2063	-732	-1329	-2901	-207	*	*											
39	908	-160	-1318	1747	-1175	-767	-554	-1775	-701	-1269	-1816	-1303	824	967	545	517	-1113	-1151	-1394	-1236

-	206	979	-178	-352	-36	372	585	-635	438	-130	-677	-164	41	-73	-335	-54	27	-12	-255	-97
-	-740	-8654	-1327	-732	-1329	-3324	-152	*	*											
40	-530	243	-914	2549	-772	-364	-151	-1371	-298	-866	-1413	-900	-695	1035	-1071	-790	-709	-748	-991	-833
-	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*
-	*	*	*	*	*	*	*	*	0											

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NY02:195668.1

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HMMER2.0
NAME Zn-f.txt
DESC
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ALPH  Amino
RF    no
CS    no
COM   [converted from an old Plan9 HMM]
NSEQ  0
DATE  Mon Mar  8 11:49:05 1999
XT      -8455     -4  -1000  -1000  -8455     -4  -8455     -4
NULT      -4  -8455
NULE     595  -1558     85    338   -294    453  -1158    197    249    902  -1085   -142    -21   -313     45    531    201    384  -1998   -644
HMM        A      C      D      E      F      G      H      I      K      L      M      N      P      Q      R      S      T      V      W      Y

         m->m   m->i   m->d   i->m   i->i   d->m   d->d   b->m   m->e
          -14      *  -6720
     1    -57   3519   -441   -615   -299    109    322   -898    175   -393   -940   -427   -222   -336   -598   -317   -236   -275   -518   -360
     -    206    979   -178   -352    -36    372    585   -635    438   -130   -677   -164     41    -73   -335    -54     27    -12   -255    -97
     -    -19  -6866  -7866   -732  -1329    -76  -4293    -14      *
     2    -57    716   -134   -615   -299    109    322   -898    175   -393   -940   -427   2018   -336   -598   -317   -236   -275   -518   -360
     -    206    979   -178   -352    -36    372    585   -635    438   -130   -677   -164     41    -73   -335    -54     27    -12   -255    -97
     -    -19  -6866  -7866   -732  -1329    -76  -4293      *      *
     3    -57    716   -441   -615   -299   1756    322   -898    175   -393   -940   -427   -222   -336   -598   -102   -236   -275   -518   -360
     -    206    979   -178   -352    -36    372    585   -635    438   -130   -677   -164     41    -73   -335    -54     27    -12   -255    -97
     -    -19  -6866  -7866   -732  -1329    -76  -4293      *      *
     4    -57   1131   -441   -615   -299    109   3048   -898    175   -393   -940   -427   -222   -336   -598   -317   -236   -275   -518   -360
     -    206    979   -178   -352    -36    372    585   -635    438   -130   -677   -164     41    -73   -335    -54     27    -12   -255    -97
     -  -1160  -6866   -879   -732  -1329    -76  -4293      *      *
     5    191    964   -194   -367    -51    357    570   -651    423   -146     94   -180     25    -88   -350    -69     11    -27   -270   -112
     -    206    979   -178   -352    -36    372    585   -635    438   -130   -677   -164     41    -73   -335    -54     27    -12   -255    -97
     -    -41  -5731  -6731   -732  -1329  -1256   -782      *      *
     6    191    964   -194   -367    -51    357    570   -651    423   -146   -692   -180    301    -88   -350    -69     11    -27   -270   -112
     -    206    979   -178   -352    -36    372    585   -635    438   -130   -677   -164     41    -73   -335    -54     27    -12   -255    -97
     -    -41  -5731  -6731   -732  -1329  -1256   -782      *      *
     7    358    964   -194   -367    -51    357    570   -651    423   -146   -692   -180     25    -88   -350    -69     11    -27   -270   -112
     -    206    979   -178   -352    -36    372    585   -635    438   -130   -677   -164     41    -73   -335    -54     27    -12   -255    -97
     -    -41  -5731  -6731   -732  -1329  -1256   -782      *      *
     8    191    964   -194   -367    -51    357    570   -651    423   -146   -692   -180     25    267   -350    -69     11    -27   -270   -112
     -    206    979   -178   -352    -36    372    585   -635    438   -130   -677   -164     41    -73   -335    -54     27    -12   -255    -97
     -    -41  -5731  -6731   -732  -1329  -1256   -782      *      *
     9    191    964   -194   -367    -51    357    570   -651    423   -146   -692   -180     25    -88   -350    137     11    -27   -270   -112
     -    206    979   -178   -352    -36    372    585   -635    438   -130   -677   -164     41    -73   -335    -54     27    -12   -255    -97
     -    -41  -5731  -6731   -732  -1329  -1256   -782      *      *
```

10	191	964	-194	-367	-51	357	570	-651	423	-146	94	-180	25	-88	-350	-69	11	-27	-270	-112
-	206	979	-178	-352	-36	372	585	-635	438	-130	-677	-164	41	-73	-335	-54	27	-12	-255	-97
-	-41	-5731	-6731	-732	-1329	-1256	-782	*	*											
11	191	964	-194	-367	-51	357	570	-651	423	-146	-692	-180	25	-88	-350	-69	11	-27	743	-112
-	206	979	-178	-352	-36	372	585	-635	438	-130	-677	-164	41	-73	-335	-54	27	-12	-255	-97
-	-41	-5731	-6731	-732	-1329	-1256	-782	*	*											
12	191	964	-194	-86	-51	357	570	-651	423	-146	-692	-180	25	-88	-350	-69	11	-27	-270	-112
-	206	979	-178	-352	-36	372	585	-635	438	-130	-677	-164	41	-73	-335	-54	27	-12	-255	-97
-	-41	-5731	-6731	-732	-1329	-1256	-782	*	*											
13	191	964	-194	-367	-51	357	570	-284	423	-146	-692	-180	25	-88	-350	-69	11	-27	-270	-112
-	206	979	-178	-352	-36	372	585	-635	438	-130	-677	-164	41	-73	-335	-54	27	-12	-255	-97
-	-41	-5731	-6731	-732	-1329	-1256	-782	*	*											
14	191	964	-194	-367	-51	357	570	-651	423	-146	-692	-180	25	-88	-350	-69	11	193	-270	-112
-	206	979	-178	-352	-36	372	585	-635	438	-130	-677	-164	41	-73	-335	-54	27	-12	-255	-97
-	-41	-5731	-6731	-732	-1329	-1256	-782	*	*											
15	191	964	-194	-367	-51	357	570	-651	423	-146	-692	-180	25	-88	-350	-69	253	-27	-270	-112
-	206	979	-178	-352	-36	372	585	-635	438	-130	-677	-164	41	-73	-335	-54	27	-12	-255	-97
-	-41	-5731	-6731	-732	-1329	-1256	-782	*	*											
16	191	964	-194	-367	-51	357	570	-651	423	25	-692	-180	25	-88	-350	-69	11	-27	-270	-112
-	206	979	-178	-352	-36	372	585	-635	438	-130	-677	-164	41	-73	-335	-54	27	-12	-255	-97
-	-41	-5731	-6731	-732	-1329	-1256	-782	*	*											
17	191	964	-194	-86	-51	357	570	-651	423	-146	-692	-180	25	-88	-350	-69	11	-27	-270	-112
-	206	979	-178	-352	-36	372	585	-635	438	-130	-677	-164	41	-73	-335	-54	27	-12	-255	-97
-	-41	-5731	-6731	-732	-1329	-1256	-782	*	*											
18	191	1364	-194	-367	-51	357	570	-651	423	-146	-692	-180	25	-88	-350	-69	11	-27	-270	-112
-	206	979	-178	-352	-36	372	585	-635	438	-130	-677	-164	41	-73	-335	-54	27	-12	-255	-97
-	-41	-5731	-6731	-732	-1329	-1256	-782	*	*											
19	191	964	-194	-367	-51	357	570	-651	423	-146	-692	-180	301	-88	-350	-69	11	-27	-270	-112
-	206	979	-178	-352	-36	372	585	-635	438	-130	-677	-164	41	-73	-335	-54	27	-12	-255	-97
-	-41	-5731	-6731	-732	-1329	-1256	-782	*	*											
20	191	964	-88	-367	-51	468	570	-651	423	-146	-692	-180	25	-88	-350	-69	11	-27	-270	-112
-	206	979	-178	-352	-36	372	585	-635	438	-130	-677	-164	41	-73	-335	-54	27	-12	-255	-97
-	-41	-5731	-6731	-732	-1329	-1256	-782	*	*											
21	191	964	-194	-367	-51	357	968	-651	423	-146	-692	-180	25	-88	-350	-69	11	-27	-270	-112
-	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*
-	*	*	*	*	*	*	*	*	0											

//

```
wdef(pkc,protein, 'protein kinase C').
wdef(position, site, site).
wdef(positions,site, site).
wdef(protease,protein,protease).
wdef(ps1,protein,'presenilin 1').
wdef(ps2,protein,'presenilin 2').
wdef(rap1, protein, 'Rap1').
wdef(ras, protein, 'Ras').
wdef(receptors, substance, receptor).
wdef(rela, protein, 'RelA').
wdef(residues,substance,residue).
wdef(responsive, state, active).
wdef(s6, protein, 'S6').
wdef(selectively, constraint, selective).
wdef(ser112, site, 'Ser112').
wdef(ser136, site, 'Ser136').
wdef(ser32, smallmolecule, 'Ser32').
phrase(ps1, protein
wdef(ser36, smallmolecule, 'Ser36').
phrase(ps1, protein, [ps1,'-',ctf], 'ps1-ctf',r).
wdef(sh2,domain, 'SH2').
wdef(sh3,domain,'SH3').
wdef(shc, protein, 'Shc').
wdef(signalsome, complex,signalsome).
wdef(sites, site,site).
wdef(sos, protein, 'Sos').
wdef(staurosporine,smallmolecule,staurosporine).
wdef(sts,smallmolecule,'STS').
wdef(tcr, complex, 'T-cell receptor').
wdef(tetracycline, smallmolecule,tetracycline).
wdef(thr229,aminoacid, 'Thr229').
wdef(thr308,aminoacid,'Thr308').
wdef(thr389, aminoacid, 'Thr389').
wdef(threonine,aminoacid,threonine).
wdef(tyrosine, aminoacid, tyrosine).
wdef(unresponsive, state,inactive).
wdef(unstimulated, state, inactive).
wdef(zvad,smallmolecule,'zVAD').
```

```
% lexsyn.pat
% revised March 17, 2000
%                  SYNTACTIC LEXICON FOR ACTIONS
% Contains syntactic entries for action type words and phrases
%
% synp(+Word1,+Wordlist,+Syn)
% synp: Word1 is first word of phrase, Wordlist is list of words i
n phrase
% synp: Syn is syntactic categorey
%
% synw(+Word,+Syn) is same as synp except there is no wordlist
%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%

synp(account,[account,for],v).
synp(account,[account,for],vp).
synp(accounted, [accounted,for],ved).
synp(accounted, [accounted,for],ven).
synp(accounting, [accounting,for],ving).
synp(accounting,[accounting,for],n).
synp(accounts, [accounts,for],vp).
synp(add, [add, up],vp).
synp(add,[add, up],v).
synp(added,[added, up],ved).
synp(added,[added, up],ven).
synp(adding,[adding, up],n).
synp(adding,[adding, up],ving).
synp(adds, [adds, up],vp).
synp(am, [am,a,means,of, producing],vp).
synp(am, [am,due,to],vp).
synp(are, [are,a,means,of, producing],vp).
synp(are, [are,due,to],vp).
synp(as,[as,a,result,of],prep).
synp(attributable,[attributable,to],vp). % ?
synp(attributed,[attributed,to],ven).
synp(based,[based,on],ven).
synp(based,[based,upon],ven).
synp(be, [be,a,means,of, producing],v).
synp(be, [be,due,to],v).
synp(because,[because,of],prep).
synp(been, [been,a,means,of, producing],ven).
synp(been, [been,due,to],ven).
synp(being, [being,a,means,of, producing],n).
synp(being, [being,a,means,of, producing],ving).
```

Appendix B

```
synp(being, [being,due,to],n).
synp(being, [being,due,to],ving).
synp(caused, [caused,by],ved).
synp(caused, [caused,by],ven).
synp(convey,[convey,a, signal],v).
synp(convey,[convey,a, signal],vp).
synp(conveyed,[conveyed,a, signal],ved).
synp(conveyed,[conveyed,a, signal],ven).
synp(conveying,[conveying, a, signal],ving).
synp(conveying,[conveying,a, signal],n).
synp(conveys,[conveys,a, signal],vp).
synp(dissociate,[dissociate, from],vp).
synp(dissociate,[dissociate,from],v).
synp(dissociated,[dissociated,from],ved).
synp(dissociated,[dissociated,from],ven).
synp(dissociates,[dissociates, from],vp).
synp(dissociating,[dissociating,from],n).
synp(dissociating,[dissociating,from],ving).
synp(dissociation,[dissociation, from],n).
synp(down,[down,'-',regulate],v).
synp(down,[down,'-',regulate],vp).   %  A down-regulates B        A
 --> B
synp(down,[down,'-',regulated],ved).
synp(down,[down,'-',regulated],ven).
synp(down,[down,'-',regulates],vp).
synp(down,[down,'-',regulating],n).
synp(down,[down,'-',regulating],ving).
synp(down,[down,'-',regulation],n).
synp(due,[due,to,the,fact,that],adj).
synp(due,[due,to],adj). % ?
synp(form,[form, complex],v).
synp(form,[form, complex],vp).
synp(formation,[formation, of, complex],n).
synp(formed,[formed, complex],ved).
synp(formed,[formed, complex],ven).
synp(forming,[forming, complex],n).
synp(forming,[forming, complex],ving).
synp(forms,[forms, complex],vp).
synp(had, [had,an,active,role,in],ved).
synp(had, [had,an,active,role,in],ven).
synp(has, [has,an,active,role,in],vp).
synp(have, [have,an,active,role,in],v).
synp(have, [have,an,active,role,in],vp).
```

```
synp(having, [having,an,active,role,in],n).
synp(having, [having,an,active,role,in],ving).
synp(is, [is,a,means,of, producing],vp).
synp(is, [is,due,to],vp).
synp(functions,[functions,as,a,negative,regulator,of],vp).
synp(function, [function,as,a,negative,regulator,of],vp).
synp(lead, [lead,to],v).
synp(leads, [leads,to],vp).
synp(leading, [leading,to],n).
synp(leading, [leading,to],ving ).
synp(leads, [leads,to],vp ).
synp(led,[led,to],ved).
synp(led,[led,to],ven).
synp(may,[may,be,responsible,for],vp).
synp(mediate,[mediate, a, signal], v).    %A mediates a signal to
B
synp(mediate,[mediate, a, signal], vp).
synp(mediated,[mediated, a, signal], ved).
synp(mediated,[mediated, a, signal], ven).
synp(mediates,[mediates, a, signal], vp).
synp(mediating,[mediating, a, signal], n).
synp(mediating,[mediating, a, signal], ving).
synp(mediation, [mediation,of, a, signal],n).
synp(n,[n,'-',acetylate],v).
synp(n,[n,'-',acetylate],vp).
synp(n,[n,'-',acetylated],ved).
synp(n,[n,'-',acetylated],ven).
synp(n,[n,'-',acetylates],vp).
synp(n,[n,'-',acetylating],n).
synp(n,[n,'-',acetylating],ving).
synp(n,[n,'-',acetylation],n).
synp(n,[n,'-',acylate],v).
synp(n,[n,'-',acylate],vp).
synp(n,[n,'-',acylated],ved).
synp(n,[n,'-',acylated],ven).
synp(n,[n,'-',acylates],vp).
synp(n,[n,'-',acylating],n).
synp(n,[n,'-',acylating],ving).
synp(n,[n,'-',acylation],n).
synp(n,[n,'-',glycosylate],v).
synp(n,[n,'-',glycosylate],vp).
synp(n,[n,'-',glycosylated],ved).
synp(n,[n,'-',glycosylated],ven).
```

```
synp(n,[n,'-',glycosylates],vp).
synp(n,[n,'-',glycosylating],n).
synp(n,[n,'-',glycosylating],ving).
synp(n,[n,'-',glycosylation],n).
synp(n,[n,'-',terminal,proteolysis],n).
synp(o,[o,'-',glycosylate],v).
synp(o,[o,'-',glycosylate],vp).
synp(o,[o,'-',glycosylated],ved).
synp(o,[o,'-',glycosylated],ven).
synp(o,[o,'-',glycosylates],vp).
synp(o,[o,'-',glycosylating],n).
synp(o,[o,'-',glycosylating],ving).
synp(o,[o,'-',glycosylation],n).
synp(only, [only,after],prep).
synp(prolyl, [prolyl,'-',4,'-',hydroxylate],v ).
synp(prolyl, [prolyl,'-',4,'-',hydroxylate],vp).
synp(prolyl, [prolyl,'-',4,'-',hydroxylated],ved ).
synp(prolyl, [prolyl,'-',4,'-',hydroxylated],ven ).
synp(prolyl, [prolyl,'-',4,'-',hydroxylates],vp).
synp(prolyl, [prolyl,'-',4,'-',hydroxylating],n ).
synp(prolyl, [prolyl,'-',4,'-',hydroxylating],ving ).
synp(prolyl, [prolyl,'-',4,'-',hydroxylation],n).
synp(result, [result,from],v).
synp(result, [result,from],vp).
synp(result,[result,in],v).
synp(result,[result,in],vp).
synp(resulted, [resulted,from],ved).
synp(resulted, [resulted,from],ven).
synp(resulted, [resulted,in],ved).
synp(resulted, [resulted,in],ven).
synp(resulting, [resulting,from],n).
synp(resulting, [resulting,from],ving).
synp(resulting, [resulting,in],n).
synp(resulting,[resulting,in],ving).
synp(results, [results,from],vp).
synp(results,[results,in],vp).
synp(set, [set, free],v).
synp(set, [set, free],v).
synp(set, [set, free],ved).
synp(set, [set, free],ved).
synp(set, [set, free],ven).
synp(set, [set, free],ven).
synp(set, [set, free],vp).
```

```
synp(set, [set, free],vp).
synp(sets, [sets, free],vp).
synp(sets, [sets, free],vp).
synp(setting, [setting, free],n).
synp(setting, [setting, free],n).
synp(setting, [setting, free],ving).
synp(setting, [setting, free],ving).
synp(suppress, [suppress, activity, of],v).
synp(suppress, [suppress, activity, of],vp).
synp(suppressed, [suppressed, activity, of],ved).
synp(suppressed, [suppressed, activity, of],ven).
synp(suppresses, [suppresses, activity, of],vp).
synp(suppressing, [suppressing, activity, of],n).
synp(suppressing, [suppressing, activity, of],ving).
synp(suppression, [suppression,of, activity, of],n).
synp(switch,[switch, on, the, activity, of],vp).
synp(switched,[switched, on, the, activity, of],ved).
synp(switched,[switched, on, the, activity, of],ved).
synp(switched,[switched, on, the, activity, of],ved).
synp(switched,[switched, on, the, activity, of],ved).
synp(switched,[switched, on, the, activity, of],ved).
synp(switches,[switches, on, the, activity, of],vp).
synp(up,[up,'-',regulate],v).  %  A up-regulates B B --> A
synp(up,[up,'-',regulate],vp).  %  A up-regulates B B --> A
synp(up,[up,'-',regulated], ved).
synp(up,[up,'-',regulated],ven).  %  A up-regulates B B --> A
synp(up,[up,'-',regulates], vp).
synp(up,[up,'-',regulating],n).  %  A up-regulates B B --> A
synp(up,[up,'-',regulating],ving).  %  A up-regulates B B --> A
synp(up,[up,'-',regulation],n).
synp(was, [was,a,means,of, producing],ved).
synp(was, [was,due,to],ved).
synp(were, [were,a,means,of, producing],ved). % ?
synp(were, [were,due,to],ved).
synw(acetylate,v).
synw(acetylate,vp).
synw(acetylated,ved).
synw(acetylated,ven).
synw(acetylates,vp).
synw(acetylating,n).
synw(acetylating,ving).
synw(acetylation,n).
synw(activate,v).
```

```
synw(activate,vp).
synw(activated,ved).
synw(activated,ven).
synw(activates,vp).
synw(activating,n).
synw(activating,ving).
synw(activation,n).
synw(add,v).
synw(add,vp).
synw(added,ved).
synw(added,ven).
synw(adding,n).
synw(adding,ving).
synw(addition,n).
synw(adds,vp).
synw(after,prep).
synw(aggregate ,v).
synw(aggregate ,vp).
synw(aggregated ,ved).
synw(aggregated ,ven).
synw(aggregates,vp).
synw(aggregating ,n).
synw(aggregating ,ving).
synw(aggregation ,n).
synw(arrest,n).
synw(arrest,v).
synw(arrest,vp).
synw(arrested,ved).
synw(arrested,ven).
synw(arresting,n).
synw(arresting,ving).
synw(arrests,vp).
synw(associate,v).
synw(associate,vp).
synw(associated,ved).
synw(associated,ven).
synw(associates,vp).
synw(associating,n).
synw(associating,ving).
synw(association,n).
synw(attach ,v).
synw(attach,vp).
synw(attached ,ved).
```

```
synw(attached ,ven).
synw(attaches,vp).
synw(attaching ,n).
synw(attaching ,ving).
synw(attachment,n).
synw(bind,v).
synw(bind,vp).
synw(binding,n).
synw(binding,ving).
synw(binds,vp).
synw(block,v).
synw(block,vp).
synw(blockage,n).
synw(blocked,ved).
synw(blocked,ven).
synw(blocking,n).
synw(blocking,ving).
synw(blocks,vp).
synw(bound,ved).
synw(bound,ven).
synw(break,v).
synw(break,vp).
synw(breakage, n).
synw(breaking,n).
synw(breaking,ving).
synw(breaks,vp).
synw(broke,ved).
synw(broken,ven).
synw(catalyzation,n).
synw(catalyze,v).
synw(catalyze,vp).
synw(catalyzed,ved).
synw(catalyzed,ven).
synw(catalyzes,vp).
synw(catalyzing,n).
synw(catalyzing,ving).
synw(causation,n).
synw(cause,n).
synw(cause,v).
synw(cause,ven).
synw(cause,vp).
synw(caused,ved).
synw(causes,vp).
```

```
synw(causing, n).
synw(causing, ving).
synw(cleavage,n).
synw(cleave,v).
synw(cleave,vp).
synw(cleaved,ved).
synw(cleaved,ven).
synw(cleaves,vp).
synw(cleaving,n).
synw(cleaving,ving).
synw(coimmunoprecipitate ,v).
synw(coimmunoprecipitate,vp).
synw(coimmunoprecipitated ,ved).
synw(coimmunoprecipitated ,ven).
synw(coimmunoprecipitates,vp).
synw(coimmunoprecipitating ,n).
synw(coimmunoprecipitating ,ving).
synw(coimmunoprecipitation ,n).
synw(combination ,n).
synw(combine ,v).
synw(combine ,vp).
synw(combined ,ved).
synw(combined ,ven).
synw(combines,vp).
synw(combining ,n).
synw(combining ,ving).
synw(conjugate ,v).
synw(conjugate ,vp).
synw(conjugated ,ve).
synw(conjugated ,ved).
synw(conjugates,vp).
synw(conjugating ,n).
synw(conjugating ,ving).
synw(conjugation ,n).
synw(connect ,vp).
synw(connect,v).
synw(connected ,ve).
synw(connected ,ved).
synw(connecting ,n).
synw(connecting ,ving).
synw(connection ,n).
synw(connects,vp).
synw(constrain,v).
```

```
synw(constrain,vp).
synw(constrained,ved).
synw(constrained,ven).
synw(constraining,n).
synw(constraining,ving).
synw(constrains,vp).
synw(constraint,n).
synw(coprecipitate,v).
synw(coprecipitate,vp).
synw(coprecipitated,ved).
synw(coprecipitated,ven).
synw(coprecipitates, vp).
synw(coprecipitating,n).
synw(coprecipitating,ving).
synw(coprecipitation ,n).
synw(copurification ,n).
synw(copurified ,ved).
synw(copurified ,ven).
synw(copurifies,vp).
synw(copurify ,vp).
synw(copurify,v).
synw(copurifying ,n).
synw(copurifying ,ving).
synw(couple ,vp).
synw(couple,v).
synw(coupled,ved).
synw(coupled,ven).
synw(couples,vp).
synw(coupling,n).
synw(coupling,ving).
synw(cut,n).
synw(cut,v).
synw(cut,ved).
synw(cut,ven).
synw(cut,vp).
synw(cuts,vp).
synw(cutting,n).
synw(cutting,ving).
synw(deactivate,v).
synw(deactivate,vp).
synw(deactivated,ved).
synw(deactivated,ven).
synw(deactivates,vp).
```

```
synw(deactivating,n).
synw(deactivating,ving).
synw(deactivation,n).
synw(death,n).
synw(demethylate,v).
synw(demethylate,vp).
synw(demethylated,ved).
synw(demethylated,ven).
synw(demethylates, vp).
synw(demethylating,n).
synw(demethylating,ving).
synw(demethylation, n).
synw(dephosphorylate, v).
synw(dephosphorylate, vp).
synw(dephosphorylated, ved).
synw(dephosphorylated, ven).
synw(dephosphorylates, vp).
synw(dephosphorylating, n).
synw(dephosphorylating, ving).
synw(dephosphorylation, n).
synw(die,v).
synw(die,vp).
synw(died,ved).
synw(died,ven).
synw(dies,vp).
synw(disassemble, v).
synw(disassemble, vp).
synw(disassembled, ved).
synw(disassembled, ven).
synw(disassembles, vp).
synw(disassembling, n).
synw(disassembling, ving).
synw(disassembly, n).
synw(discharge,n).
synw(discharge,v).
synw(discharge,vp).
synw(discharged,ved).
synw(discharged,ven).
synw(discharges,vp).
synw(discharging,n).
synw(discharging,ving).
synw(disengage,v).
synw(disengage,vp).
```

```
synw(disengaged,ved).
synw(disengaged,ven).
synw(disengagement,n).
synw(disengages,vp).
synw(disengaging,n).
synw(disengaging,ving).
synw(divide,v).
synw(divide,vp).
synw(divided,ved).
synw(divided,ven).
synw(divides,vp).
synw(dividing,n).
synw(dividing,ving).
synw(division,n).
synw(dying,n).
synw(dying,ving).
synw(enhance,v).
synw(enhance,vp).
synw(enhanced,ved).
synw(enhanced,ven).
synw(enhancement,n).
synw(enhances,vp).
synw(enhancing,n).
synw(enhancing,ving).
synw(express,v).
synw(express,vp).
synw(expressed,ved).
synw(expressed,ved).
synw(expressed,ven).
synw(expresses,vp).
synw(expressing,n).
synw(expressing,n).
synw(expressing,ving).
synw(expression,n).
synw(generate,v).
synw(generate,vp).
synw(generated,ved).
synw(generated,ven).
synw(generates,vp).
synw(generating,n).
synw(generating,ving).
synw(generation,n).
synw(hew,v).
```

```
synw(hew,vp).
synw(hewed,ved).
synw(hewed,ven).
synw(hewing,n).
synw(hewing,ving).
synw(hews,vp).
synw(hinder,v).
synw(hinder,vp).
synw(hindered,ved).
synw(hindered,ven).
synw(hindering,n).
synw(hindering,ving).
synw(hinders, vp).
synw(hindrance,n).
synw(inactivate,v).
synw(inactivate,vp).
synw(inactivated,ved).
synw(inactivated,ven).
synw(inactivates, vp).
synw(inactivating,n).
synw(inactivating,ving).
synw(inactivation, n).
synw(incite,v).
synw(incite,vp).
synw(incited,ved).
synw(incited,ven).
synw(incitement,n).
synw(incites,vp).
synw(inciting,n).
synw(inciting,ving).
synw(induce,v).
synw(induce,vp).
synw(induced,ved).
synw(induced,ven).
synw(induces,vp).
synw(inducing,n).
synw(inducing,ving).
synw(induction,n).
synw(influence,n).
synw(influence,v).
synw(influence,vp).
synw(influenced,ved).
synw(influenced,ven).
```

```
synw(influences,vp)..
synw(influencing,n).
synw(influencing,ving). % ?
synw(inhibit,v).
synw(inhibit,vp).
synw(inhibited,ved).
synw(inhibited,ven).
synw(inhibiting,n).
synw(inhibiting,ving).
synw(inhibition,n).
synw(inhibits,vp).
synw(initiate,v).
synw(initiate,vp).
synw(initiated,ved).
synw(initiated,ven).
synw(initiates,vp).
synw(initiating,n).
synw(initiating,ving).
synw(initiation,vp).
synw(instigate,v).
synw(instigate,vp).
synw(instigated,ved).
synw(instigated,ven).
synw(instigates,vp).
synw(instigating,n).
synw(instigating,ving).
synw(instigation,n).
synw(interact,v).
synw(interact,vp).
synw(interacted,ved).
synw(interacted,ven).
synw(interacting,n).
synw(interacting,ving).
synw(interaction,n).
synw(interactions,n).
synw(interacts,vp).
synw(join ,vp).
synw(join,v).
synw(joined,ved).
synw(joined,ven).
synw(joining,n).
synw(joining,ving).
synw(joins,vp).
```

```
synw(juncture,n).
synw(liberate,v).
synw(liberate,vp).
synw(liberated,ved).
synw(liberated,ven).
synw(liberates,vp).
synw(liberating,n).
synw(liberating,ving).
synw(liberation,n).
synw(limit,v).
synw(limit,vp).
synw(limitation, n).
synw(limited,ved).
synw(limited,ven).
synw(limiting,n).
synw(limiting,ving).
synw(limits,vp).
synw(link,n).
synw(link,v).
synw(link,vp).
synw(linked,ved).
synw(linked,ven).
synw(linking,n).
synw(linking,ving).
synw(links, vp).
synw(mediate,v).
synw(mediate,vp).
synw(mediated,ved).
synw(mediated,ven).
synw(mediates,vp).
synw(mediating,n).
synw(mediating,ving).
synw(mediation,n).
synw(methylate, vp).
synw(methylate,v ).
synw(methylated,ved ).
synw(methylated,ven ).
synw(methylates, vp).
synw(methylating,n ).
synw(methylating,ving ).
synw(methylation, n).
synw(modification,n).
synw(modified,ved).
```

```
synw(modified,ven).
synw(modifies,vp).
synw(modify,v).
synw(modify,vp).
synw(modifying,n).
synw(modifying,ving).
synw(mutate,v).
synw(mutate,vp).
synw(mutated,ved).
synw(mutated,ven).
synw(mutates,vp).
synw(mutating,n).
synw(mutating,ving).
synw(mutation,n).
synw(overexpress,v).
synw(overexpress,vp).
synw(overexpressed,ved).
synw(overexpressed,ven).
synw(overexpresses,vp).
synw(overexpressing,n).
synw(overexpressing,ving).
synw(overexpression,n).
synw(pair,v).
synw(pair,vp).
synw(paired,ved).
synw(paired,ven).
synw(pairing,n).
synw(pairing,ving).
synw(pairs,vp).
synw(phosphorylate,n).
synw(phosphorylate,vp).
synw(phosphorylated,ved).
synw(phosphorylated,ven).
synw(phosphorylates,vp).
synw(phosphorylating,n).
synw(phosphorylating,ving).
synw(phosphorylation, n).
synw(promote,v).
synw(promote,vp).
synw(promoted,ved).
synw(promoted,ven).
synw(promotes,vp).
synw(promoting,n).
```

```
synw(promoting,ving).
synw(promotion,n).
synw(prompt,n).
synw(prompt,v).
synw(prompt,vp).
synw(prompted,ved).
synw(prompted,ven).
synw(prompting,n).
synw(prompting,ving).
synw(prompts,vp).
synw(react,v).
synw(react,vp).
synw(reacted,ved).
synw(reacted,ven).
synw(reacting,n).
synw(reacting,ving).
synw(reaction,n).
synw(reacts,vp).
synw(regulate,v).
synw(regulate,vp).
synw(regulated,ved).
synw(regulated,ven).
synw(regulates,vp).
synw(regulating,n).
synw(regulating,ving).
synw(regulation,n).
synw(release,n).
synw(release,v).
synw(release,vp).
synw(released,ved).
synw(released,ven).
synw(releases,vp).
synw(releasing,n).
synw(releasing,ving).
synw(removal,n).
synw(remove,v).
synw(remove,vp).
synw(removed,ved).
synw(removed,ven).
synw(removes,vp).
synw(removing,n).
synw(removing,ving).
synw(replace,v).
```

```
synw(replace,vp).
synw(replaced,ved).
synw(replaced,ven).
synw(replacement,n).
synw(replaces,vp).
synw(replacing,n).
synw(replacing,ving).
synw(repress, vp).
synw(repress,v).
synw(repressed,ved).
synw(repressed,ven).
synw(represses, vp).
synw(repressing,n).
synw(repressing,ving).
synw(repression,n).
synw(require,v).
synw(require,vp).
synw(required,ved).
synw(required,ven).
synw(requirement,n).
synw(requires,vp).
synw(requiring,n).
synw(requiring,ving).
synw(restrain, vp).
synw(restrain,v).
synw(restrained,ved).
synw(restrained,ven).
synw(restraining,n).
synw(restraining,ving).
synw(restrains, vp).
synw(restraint, n).
synw(sensitization, n).
synw(sensitize,  vp).
synw(sensitize, v).
synw(sensitized,ved).
synw(sensitized,ven).
synw(sensitizes,vp).
synw(sensitizing,n).
synw(sensitizing,ving).
synw(separate,v).
synw(separate,vp).
synw(separated,ved).
synw(separated,ven).
```

```
synw(separates, vp).
synw(separating,n).
synw(separating,ving).
synw(separation, n).
synw(sever,v).
synw(sever,vp).
synw(severance,n).
synw(severed,ved).
synw(severed,ven).
synw(severing,n).
synw(severing,ving).
synw(severs,vp).
synw(signal,v).
synw(signal,vp).
synw(signaled,ved).
synw(signaled,ved).
synw(signaled,ven).
synw(signaling,n).
synw(signaling,ving).
synw(signals,vp).
synw(split,n).
synw(split,v).
synw(split,ved).
synw(split,ven).
synw(split,vp).
synw(splits,vp).
synw(splitting,n).
synw(splitting,ving).
synw(stimulate,v).
synw(stimulate,vp).
synw(stimulated,ved).
synw(stimulated,ven).
synw(stimulates,vp).
synw(stimulating,n).
synw(stimulating,ving).
synw(stimulation, n).
synw(substitute,v).
synw(substitute,vp).
synw(substituted,ved).
synw(substituted,ven).
synw(substitutes,vp).
synw(substituting,n).
synw(substituting,ving).
```

```
synw(substitution,n).
synw(suppress, vp).
synw(suppress,v).
synw(suppressed,ved).
synw(suppressed,ven).
synw(suppresses, vp).
synw(suppressing,n).
synw(suppressing,ving).
synw(suppression,n ).
synw(tie,n).
synw(tie,v).
synw(tie,vp).
synw(tied,ved).
synw(tied,ven).
synw(ties,vp).
synw(transcribe,v).
synw(transcribe,vp).
synw(transcribed,ved).
synw(transcribed,ven).
synw(transcribes,vp).
synw(transcribing,n).
synw(transcribing,ving).
synw(transcription,n).
synw(tying,n).
synw(tying,ving).
synw(ubiquitinization,n).
synw(ubiquitinize,v).
synw(ubiquitinize,vp).
synw(ubiquitinized,ved).
synw(ubiquitinized,ven).
synw(ubiquitinizes,vp).
synw(ubiquitinizing,n).
synw(ubiquitinizing,ving).
synw(urge,n).
synw(urge,v).
synw(urge,vp).
synw(urged,ved).
synw(urged,ven).
synw(urges,vp).
synw(urging,n).
synw(urging,ving).
% the following are verbs connected with complexes
synw(form,v).
```

```
synw(form,vp).
synw(forms,vp).
synw(formed,ved).
synw(formed,ven).
synw(forming,n).
synw(formation,n).
synw(assemble,v).
synw(assemble,vp).
synw(assembles,vp).
synw(assembled,ved).
synw(assembled,ven).
synw(assembling,n).
synw(assembly,n).
synw(dissassemble,v).
synw(dissassemble,vp).
synw(dissassembles,vp).
synw(dissassembled,ved).
synw(dissassembled,ven).
synw(dissassembling,n).
synw(dissassembly,n).
synw(dissociate,v).
synw(dissociate,vp).
synw(dissociates,vp).
synw(dissociated,ved).
synw(dissociated,ven).
synw(dissociating,n).
synw(dissociation,n).
synw(recruit,v).
synw(recruit,vp).
synw(recruits,vp).
synw(recruited,ved).
synw(recruited,ven).
synw(recruiting,n).
synw(recruitment,n).
```

```
% lexsemact.pat
% revised March 17, 2000
%                SEMANTIC LEXICON OF ACTIONS
%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%
%%%%%%%
% For genomics - the grammar tests for semantic and syntactic cate
gories
% separately for action type of categories; for substances the lex
ical
% entries are the same as in the medical area
% action type phrases have two entries: a semantic entry and a syn
tactic entry
% This lexicon contains the semantic entries for words and phrases

% semp is a lexical entry for phrasal lexicon
% semp(+Word1,+Sem,+Wordlist,+Targetform,+Features)
% semp specifies a semantic lexical definition for the genomics li
terature
% semp is equivalent to the predicate "phrase" in the medical area
% semp: Word1 is first word of phrase, Sem is semantic category
% semp: Wordlist is list of words in phrase, Targetform is output
form
% semp: Features is a list of 2 elements or the atom "def" represe
nting defaul
% semp: Features 1st element is rev or nrev meaning reversed or no
t reversed
% semp: Features 2nd element is a # specifying number of arguments
 for action
% semp: Features = def is equivalent to a list = [nrev,2]
% in case action has 1 argument, use [1,_]

%semw is a lexical entry for single word
% semw(+Word,+Sem,+Targetform,+Features)
% semw: the arguments are the same as for semp except there is no
Wordlist
%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%
%%%%%%%%

:- multifile(semp/5).
:- multifile(semw/4).

semp(account,cause,[account,for],cause,[def]).
semp(accounted,cause,[accounted,for],cause,[def]).
```

Appendix C

```
semp(accounting,cause,[accounting,for],cause,[def]).
semp(accounts,cause,[accounts,for],cause,[def]).
semp(add, attach, [add, up], attach, [def]).
semp(added, attach, [added, up], attach, [def]).
semp(adds, attach, [adds, up], attach, [def]).
semp(are, cause,[are,a,means,of, producing],cause,[def]).
semp(are,cause,[are,due,to],cause,[2,rev]).
semp(as,cause,[as,a,result,of],cause,[2,rev]).
semp(attributable,cause,[attributable,to],cause,[2,rev]).
semp(attributed,cause,[attributed,to],cause,[2,rev]).
semp(based,cause,[based,on],cause,[2,rev]).
semp(based,cause,[based,upon],cause,[2,rev]).
semp(because,cause,[because,of],cause,[2,rev]).
semp(convey, signal, [conveys,a, signal], signal, [def]).
semp(conveyed, signal, [conveyed,a, signal], signal, [def]).
semp(conveying, signal, [conveying, a, signal], signal, [def]).
semp(conveys, signal, [conveys,a, signal],signal, [def]).
semp(dissociate, release, [dissociate, from], release,[def]).
semp(dissociated, release, [dissociated,from], release,[def]).
semp(dissociates, release, [dissociates, from], release,[def]).
semp(dissociation, release, [dissociation, from], release,[def]).
semp(down,signal,[down,'-',regulate], signal, [def]).   % A down-
regulates B       A --> B
semp(down,signal,[down,'-',regulated], signal, [def]).   % A down
-regulates B       A --> B
semp(down,signal,[down,'-',regulates], signal, [def]).   % A down
-regulates B       A --> B
semp(down,signal,[down,'-',regulation], signal, [def]).   % A dow
n-regulates B      A --> B
semp(due,cause,[due,to,the,fact,that],cause,[2,rev]).
semp(due,cause,[due,to],cause,[2,rev]).
semp(form, attach, [form, complex], attach, [def]).
semp(formation, attach, [formation, of, complex], attach, [def]).
semp(formed, attach, [formed, complex], attach, [def]).
semp(forms, attach, [forms, complex], attach, [def]).
semp(had, cause,[had,an,active,role,in],cause,[def]).
semp(has, cause,[has,an,active,role,in],cause,[def]).
semp(have, cause,[have,an,active,role,in],cause,[def]).
semp(is, cause,[is,a,means,of, producing],cause,[def]).
semp(is,cause,[is,due,to],cause,[2,rev]).
semp(functions,inactivate,[functions,as,a,negative,regulator,of],i
nactivate,[def]).
semp(function,inactivate,[function,as,a,negative,regulator,of],ina
```

```
ctivate,[def]).
semp(lead, cause, [lead,to], cause,[def]).
semp(lead,cause1,[lead,to],cause,[def]).
semp(leading, cause, [leading,to], cause,[def]).
semp(leading,cause,[leading,to],cause,[def]).
semp(leads, cause, [leads,to], cause,[def]).
semp(leads,cause1,[leads,to],cause,[def]).
semp(led,cause,[led,to],cause,[def]).
semp(may, cause,[may,be,responsible,for],cause,[def]).
semp(mediate, signal, [mediate, a, signal], signal, [def]).    %A
mediates a signal to B
semp(mediated, signal, [mediated, a, signal], signal, [def]).    %
A mediates a signal to B
semp(mediates, signal, [mediates, a, signal], signal, [def]).    %
A mediates a signal to B
semp(mediation, signal, [mediation,of, a, signal], signal, [def]).
    %A mediates a signal to B
semp(n, createbond, [n,'-',acetylate],'N-acetylate',[def]).
semp(n, createbond, [n,'-',acetylated],'N-acetylate',[def]).
semp(n, createbond, [n,'-',acetylates],'N-acetylate',[def]).
semp(n, createbond, [n,'-',acetylation],'N-acetylate',[def]).
semp(n, createbond, [n,'-',acylate],'N-acylate',[def]).
semp(n, createbond, [n,'-',acylated],'N-acylate',[def]).
semp(n, createbond, [n,'-',acylates],'N-acylate',[def]).
semp(n, createbond, [n,'-',acylation],'N-acylate',[def]).
semp(n, createbond, [n,'-',glycosylate],'N-glycosylate',[def]).
semp(n, createbond, [n,'-',glycosylated],'N-glycosylate',[def]).
semp(n, createbond, [n,'-',glycosylates],'N-glycosylate',[def]).
semp(n, createbond, [n,'-',glycosylation],'N-glycosylate',[def]).
semp(n,breakbond,[n,'-',terminal,proteolysis],'n-terminal proteoly
sis',[def]).
semp(o, createbond, [o,'-',glycosylate], 'O-glycosylate',[def]).
semp(o, createbond, [o,'-',glycosylated], 'O-glycosylate',[def]).
semp(o, createbond, [o,'-',glycosylates], 'O-glycosylate',[def]).
semp(o, createbond, [o,'-',glycosylation], 'O-glycosylate',[def]).
semp(only,time,[only,after],'only after',[2,rev]).
semp(prolyl, createbond, [prolyl,'-',4,'-',hydroxylate],
                  'prolyl-4-hydroxylate',[def]).
semp(prolyl, createbond, [prolyl,'-',4,'-',hydroxylated],
                    'prolyl-4-hydroxylate',[def]).
semp(prolyl, createbond, [prolyl,'-',4,'-',hydroxylates],
                'prolyl-4-hydroxylate',[def]).
semp(prolyl, createbond, [prolyl,'-',4,'-',hydroxylation],
```

```
                    'prolyl-4-hydroxylate',[def]).
semp(result,cause,[result,from],cause,[2,rev]).
semp(result,cause,[result,in],cause,[def]).
semp(resulted,cause,[resulted,from],cause,[2,rev]).
semp(resulted,cause,[resulted,in],cause,[def]).
semp(resulting,cause,[resulting,from],cause,[2,rev]).
semp(resulting,cause,[resulting,in],cause,[def]).
semp(results,cause,[results,from],cause,[2,rev]).
semp(results,cause,[results,in],cause,[def]).
semp(set, release, [set, free], release ,[def]).
semp(set, release, [set, free], release ,[def]).
semp(sets, release, [sets, free], release ,[def]).
semp(setting, release, [setting, free], release ,[def]).
semp(suppress, inactivate, [suppress, activity, of], inactivate, [
def]).
semp(suppressed, inactivate, [suppressed, activity, of], inactivat
e, [def]).
semp(suppresses, inactivate, [suppresses, activity, of], inactivat
e, [def]).
semp(suppression, inactivate, [suppression,of, activity, of], inac
tivate, [def]).
semp(switch, activate, [switch, on, the, activity, of], activate
, [def]).
semp(switched, activate, [switched, on, the, activity, of], acti
vate, [def]).
semp(switches, activate, [switches, on, the, activity, of], acti
vate, [def]).
semp(up,signal,[up,'-',regulate], signal, [2,rev]). % A up-regul
ates B B --> A
semp(up,signal,[up,'-',regulated], signal, [2,rev]).
semp(up,signal,[up,'-',regulates], signal,[2,rev]).
semp(up,signal,[up,'-',regulation], signal, [2,rev]).
semp(was, cause,[was,a,means,of, producing],cause,[def]).
semp(was,cause,[was,due,to],cause,[2,rev]).
semp(were, cause,[were,a,means,of, producing],cause,[def]).
semp(were,cause,[were,due,to],cause,[2,rev]).
semw(acetylate, createbond, acetylate,[def]).
semw(acetylated, createbond, acetylate,[def]).
semw(acetylates, createbond, acetylate,[def]).
semw(acetylation, createbond, acetylate,[def]).
semw(activate, activate, activate,[def]).
semw(activated, activate, activate,[def]).
semw(activates, activate, activate,[def]).
```

```
semw(activation, activate, activate,[def]).
semw(add, attach,  attach,[def]).
semw(added, attach,  attach,[def]).
semw(addition, attach,  attach,[def]).
semw(adds, attach,  attach,[def]).
semw(after,time,after,[2,rev]).    % temporal relations
semw(aggregate ,attach,attach,[def]).
semw(aggregated ,attach,attach,[def]).
semw(aggregates, attach, attach,[def]).
semw(aggregation ,attach,attach,[def]).
semw(arrest, inactivate, inactivate,[def]).
semw(arrested, inactivate, inactivate,[def]).
semw(arrests, inactivate, inactivate,[def]).
semw(associate,attach,attach,[def]).
semw(associated,attach,attach,[def]).
semw(associates, attach, attach,[def]).
semw(association,attach,attach,[def]).
semw(attach,attach,attach,[def]).
semw(attached ,attach,attach,[def]).
semw(attaches, attach, attach,[def]).
semw(attachment, attach, attach,[def]).
semw(bind,attach,attach,[def]).
semw(binding,attach, attach,[def]).
semw(binds,attach,attach,[def]).
semw(block,inactivate,inactivate,[def]).
semw(blocked,inactivate,inactivate,[def]).
semw(blocking,inactivate,inactivate,[def]).
semw(blocks,inactivate,inactivate,[def]).
semw(bound,attach, attach,[def]).
semw(break, breakbond,  'break bond',[def]).
semw(breakage, breakbond,  'break bond',[def]).
semw(breaks, breakbond,  'break bond',[def]).
semw(broke, breakbond,  'break bond',[def]).
semw(broken, breakbond,  'break bond',[def]). % case without break
bond
semw(catalyzation,promote,catalyze,[def]).
semw(catalyze,promote,catalyze,[def]).
semw(catalyzed,promote,catalyze,[def]).
semw(catalyzes,promote,catalyze,[def]).
semw(catalyzing,promote, catalyze,[def]).
semw(cause, cause,cause,[def]).
semw(caused, cause,cause,[def]).
semw(causes, cause,cause,[def]).
```

```
semw(cleavage, breakbond,  'break bond',[def]).
semw(cleave, breakbond,  'break bond',[def]).
semw(cleaved, breakbond,  'break bond',[def]).
semw(cleaves, breakbond,  'break bond',[def]).
semw(coimmunoprecipitate, attach, attach,[def]).
semw(coimmunoprecipitated ,attach,attach,[def]).
semw(coimmunoprecipitates, attach, attach,[def]).
semw(coimmunoprecipitation ,attach,attach,[def]).
semw(combination ,attach,attach,[def]).
semw(combine ,attach,attach,[def]).
semw(combined ,attach,attach,[def]).
semw(combines, attach, attach,[def]).
semw(conjugate ,attach,attach,[def]).
semw(conjugated ,attach,attach,[def]).
semw(conjugates,  attach, attach,[def]).
semw(conjugation ,attach,attach,[def]).
semw(connect ,attach,attach,[def]).
semw(connected ,attach,attach,[def]).
semw(connection ,attach,attach,[def]).
semw(connects,  attach, attach,[def]).
semw(constrain, inactivate, inactivate,[def]).
semw(constrained, inactivate, inactivate,[def]).
semw(constrains, inactivate, inactivate,[def]).
semw(constraint, inactivate, inactivate,[def]).
semw(coprecipitate,attach,attach,[def]).
semw(coprecipitated,attach,attach,[def]).
semw(coprecipitates,  attach, attach,[def]).
semw(coprecipitation ,attach,attach,[def]).
semw(copurification ,attach,attach,[def]).
semw(copurified ,attach,attach,[def]).
semw(copurifies,  attach, attach,[def]).
semw(copurify ,attach,attach,[def]).
semw(couple ,attach,attach,[def]).
semw(coupled,attach,attach,[def]).
semw(couples, attach, attach,[def]).
semw(cut, breakbond,  'break bond',[def]).   % leave breakbond onl
y?
semw(cuts, breakbond,  'break bond',[def]).
semw(deactivate, inactivate, inactivate,[def]).
semw(deactivated, inactivate, inactivate,[def]).
semw(deactivates, inactivate, inactivate,[def]).
semw(deactivation, inactivate, inactivate,[def]).
semw(death, process, death,[1]).
```

```
semw(demethylate, breakbond, demethylate,[def]).
semw(demethylated, breakbond, demethylate,[def]).
semw(demethylates, breakbond, demethylate,[def]).
semw(demethylation, breakbond, demethylate,[def]).
semw(dephosphorylate, breakbond,dephosphorylate,[def]).
semw(dephosphorylated, breakbond,dephosphorylate,[def]).
semw(dephosphorylates, breakbond,dephosphorylate,[def]).
semw(dephosphorylation, breakbond,dephosphorylate,[def]).
semw(die, process, death,[1]).
semw(died, process, death,[1]).
semw(dies, process, death,[1]).
semw(disassemble, release, release,[def]).
semw(disassembled, release, release,[def]).
semw(disassembles, release, release,[def]).
semw(disassembly, release, release,[def]).
semw(discharge, release, release,[def]).
semw(discharged, release, release,[def]).
semw(discharges, release, release,[def]).
semw(disengage, release, release,[def]).
semw(disengaged, release, release,[def]).
semw(disengagement, release, release,[def]).
semw(disengages, release, release,[def]).
semw(divide, breakbond,  'break bond',[def]).
semw(divided, breakbond,  'break bond',[def]).
semw(divides, breakbond,  'break bond',[def]).
semw(division, breakbond,  'break bond',[def]).
semw(dying, process, death,[1]).
semw(enhance,promote,promote,[def]).
semw(enhanced,promote,promote,[def]).
semw(enhancement,promote,promote,[def]).
semw(enhances,promote,promote,[def]).
semw(enhancing,promote,promote,[def]).
semw(express, generate,express,[def]). % can have either 1 or 2 ar
guments
semw(expressed, generate,express,[def]).
semw(expresses, generate,express,[def]).
semw(expressing, generate,express,[def]).
semw(expression,generate,express,[def]).
semw(generate,generate,generate,[def]).
semw(generated,generate,generate,[def]).
semw(generates,generate,generate,[def]).
semw(generating,generate,generate,[def]).
semw(generation,generate,generate,[def]).
```

```
semw(hew, breakbond,  'break bond',[def]).
semw(hewed, breakbond,  'break bond',[def]).
semw(hews, breakbond,  'break bond',[def]).
semw(hinder, inactivate, inactivate,[def]).
semw(hindered, inactivate, inactivate,[def]).
semw(hinders, inactivate, inactivate,[def]).
semw(hindrance, inactivate, inactivate,[def]).
semw(inactivate, inactivate, inactivate,[def]).
semw(inactivated, inactivate, inactivate,[def]).
semw(inactivates, inactivate, inactivate,[def]).
semw(inactivation, inactivate, inactivate,[def]).
semw(incite, activate, activate,[def]).
semw(incited, activate, activate,[def]).
semw(incitement, activate, activate,[def]).
semw(incites, activate, activate,[def]).
semw(induce, activate, activate,[def]).
semw(induced, activate, activate,[def]).
semw(induces, activate, activate,[def]).
semw(induction, activate, activate,[def]).
semw(influence, activate, activate,[def]).
semw(influenced, activate, activate,[def]).
semw(influences, activate, activate,[def]).
semw(influencing, activate, activate,[def]).
semw(inhibit, inactivate, inactivate,[def]).
semw(inhibited, inactivate, inactivate,[def]).
semw(inhibition, inactivate, inactivate,[def]).
semw(inhibits, inactivate, inactivate,[def]).
semw(initiate, activate, activate,[def]).
semw(initiated, activate, activate,[def]).
semw(initiates, activate, activate,[def]).
semw(initiattion, activate, activate,[def]).
semw(instigate, activate, activate,[def]).
semw(instigated, activate, activate,[def]).
semw(instigates, activate, activate,[def]).
semw(instigation, activate, activate,[def]).
semw(interact, interact, interact,[def]).
semw(interacted, interact, interact,[def]).
semw(interaction, interact, interact,[def]).
semw(interactions, interact, interact,[def]).
semw(interacts, react, interact,[def]).
semw(join ,attach,attach,[def]).
semw(joined ,attach, attach,[def]).
semw(joining, attach, attach,[def]).
```

```
semw(joins, attach, attach,[def]).
semw(juncture, attach, attach,[def]).
semw(liberate, release, release,[def]).
semw(liberated, release, release,[def]).
semw(liberates, release, release,[def]).
semw(liberation, release, release,[def]).
semw(limit, inactivate, inactivate,[def]).
semw(limitation, inactivate, inactivate,[def]).
semw(limited, inactivate, inactivate,[def]).
semw(limits, inactivate, inactivate,[def]).
semw(link,attach,attach,[def]).
semw(linked,attach,attach,[def]).
semw(linking, attach,attach,[def]).
semw(links,attach, attach,[def]).
semw(mediate, promote, promote,[def]).
semw(mediated, promote, promote,[def]).
semw(mediates, promote, promote,[def]).
semw(mediation, promote, promote,[def]).
semw(methylate, createbond, methylate,[def]).
semw(methylated, createbond, methylate,[def]).
semw(methylates, createbond, methylate,[def]).
semw(methylation, createbond, methylate,[def]).
semw(modification,modify,modify,[def]).
semw(modified,modify,modify,[def]).
semw(modifies,modify,modify,[def]).
semw(modify,modify,modify,[def]).
semw(modifying,modify,modify,[def]).
semw(mutate,modify,mutate,[1]).
semw(mutated,modify,mutate,[1]).
semw(mutates,modify,mutate,[1]).
semw(mutating, modify,mutate,[1]).
semw(mutation,modify,mutate,[1]).
semw(overexpressed, generate,overexpress,[def]).
semw(overexpresses, generate,overexpress,[def]).
semw(overexpressing, generate,overexpress,[def]).
semw(overexpress, generate, express,[def]).
semw(overexpression,generate,overexpress,[def]).
semw(pair,attach,attach,[def]).
semw(paired,attach,attach,[def]).
semw(pairing,attach, attach,[def]).
semw(pairs,attach, attach,[def]).
semw(phosphorylate, createbond, phosphorylate,[def]).
semw(phosphorylated, createbond, phosphorylate,[def]).
```

```
semw(phosphorylates, createbond, phosphorylate,[def]).
semw(phosphorylation, createbond, phosphorylate,[def]).
semw(precede, cause, cause,[def]).
semw(preceded, cause, cause, [def]).
semw(precedes, cause, cause, [def]).
semw(preceding, cause, cause, [def]).
semw(promote,promote,promote,[def]).
semw(promoted,promote,promote,[def]).
semw(promotes,promote,promote,[def]).
semw(promotion,promote,promote,[def]).
semw(prompt, activate, activate,[def]).
semw(prompted, activate, activate,[def]).
semw(prompting, activate, activate,[def]).
semw(prompts, activate, activate,[def]).
semw(react, react, react,[def]).
semw(reacted, react, react,[def]).
semw(reaction, react, react,[def]).
semw(reactions, react, react,[def]).
semw(reacts, react, react,[def]).
semw(regulate, signal, signal,[def]).
semw(regulated, signal, signal,[def]).        % B is regulated by
A   A --> B
semw(regulates, signal, signal,[def]).
semw(regulation, signal, signal,[def]).
semw(release, release, release,[def]).
semw(released, release, release,[def]).
semw(releases, release, release,[def]).
semw(removal, breakbond, 'break bond ',[def]).
semw(remove, breakbond, 'break bond ',[def]).
semw(remove, breakbond, 'break bond ',[def]).
semw(removes, breakbond, 'break bond ',[def]).
semw(replace, substitute, substitute,[def]).
semw(replaced, substitute, substitute,[def]).
semw(replacement, substitute, substitute,[def]).
semw(replaces, substitute, substitute,[def]).
semw(repress, inactivate, inactivate,[def]).
semw(repressed, inactivate, inactivate,[def]).
semw(represses, inactivate, inactivate,[def]).
semw(repression, inactivate, inactivate,[def]).
semw(require, cause, cause,[2,rev]).
semw(required, cause, cause,[2,rev] ).
semw(requirement, cause, cause,[2,rev]).
semw(requires, cause, cause,[2,rev] ).
```

```
semw(requiring, cause, cause,[2,rev] ).
semw(restrain, inactivate, inactivate,[def]).
semw(restrained, inactivate, inactivate,[def]).
semw(restrains, inactivate, inactivate,[def]).
semw(restraint, inactivate, inactivate,[def]).
semw(sensitization, activate, activate,[def]).
semw(sensitize, activate, activate,[def]).
semw(sensitized, activate, activate,[def]).
semw(sensitizes, activate, activate,[def]).
semw(separate, breakbond,  'break bond',[def]).
semw(separated, breakbond,  'break bond',[def]).
semw(separates, breakbond,  'break bond',[def]).
semw(separation, breakbond,  'break bond',[def]).
semw(sever, breakbond,  'break bond',[def]).
semw(severance, breakbond,  'break bond',[def]).
semw(severed, breakbond,  'break bond',[def]).
semw(severs, breakbond,  'break bond',[def]).
semw(signal, signal, signal,[def]).
semw(signaled, signal, signal,[def]).
semw(signaling, signal, signal,[def]).
semw(signals, signal, signal,[def]).
semw(split, breakbond,  'break bond',[def]).
semw(splits, breakbond,  'break bond',[def]).
semw(splitting,breakbond, 'break bond',[def]).
semw(stimulate, activate, activate,[def]).
semw(stimulated, activate, activate,[def]).
semw(stimulates, activate, activate,[def]).
semw(stimulation, activate, activate,[def]).
semw(substitute,  substitute, substitute,[def]).
semw(substituted,  substitute, substitute,[def]).
semw(substitutes,  substitute, substitute,[def]).
semw(substitution,  substitute, substitute,[def]).
semw(suppress, inactivate, inactivate,[def]).
semw(suppressed, inactivate, inactivate,[def]).
semw(suppresses, inactivate, inactivate,[def]).
semw(suppression, inactivate, inactivate,[def]).
semw(tie,attach,attach,[def]).
semw(tied,attach,attach,[def]).
semw(ties,attach,attach,[def]).
semw(transcribe,generate,transcribe,[def]).
semw(transcribed,generate,transcribe,[def]).
semw(transcribes,generate,transcribe,[def]).
semw(transcribing,generate,transcribe,[def]).
```

```
semw(transcription,generate,transcribe,[def]).
semw(ubiquitinize, createbond, ubiquitinize,[def]).
semw(ubiquitinize, createbond, ubiquitinize,[def]).
semw(ubiquitinized, createbond, ubiquitinize,[def]).
semw(ubiquitinizes, createbond, ubiquitinize,[def]).
semw(urge, activate, activate,[def]).
semw(urge, activate, activate,[def]).
semw(urged, activate, activate,[def]).
semw(urges, activate, activate,[def]).
semw(urging, activate, activate,[def]).
semw(form,attach,attach,[def]).
semw(forms,attach,attach,[def]).
semw(formed,attach,attach,[def]).
semw(forming,attach,attach,[def]).
semw(formation,attach,attach,[def]).
semw(assemble,attach,attach,[def]).
semw(assembles,attach,attach,[def]).
semw(assembled,attach,attach,[def]).
semw(assembling,attach,attach,[def]).
semw(assembly,attach,attach,[def]).
semw(dissassemble,release,release,[def]).
semw(dissassembles,release,release,[def]).
semw(dissassembled,release,release,[def]).
semw(dissassembling,release,release,[def]).
semw(dissassembly,release,release,[def]).
semw(dissociate,release,release,[def]).
semw(dissociates,release,release,[def]).
semw(dissociated,release,release,[def]).
semw(dissociating,release,release,[def]).
semw(dissociation,release,release,[def]).
semw(recruit,attach,attach,[def]).
semw(recruits,attach,attach,[def]).
semw(recruited,attach,attach,[def]).
semw(recruiting,attach,attach,[def]).
semw(recruitment,attach,attach,[def]).
```

```
% edited Genome grammar - adapted from MedLEE's grammar for use with MedLEE
% this is to be used along with the genomics lexicon of substances, actions,
%   and relations.
% revised March 16, April 5, 2000
% adjusted for tagged input
:- multifile(wdef/3).
:- multifile(phrase/5).
%%%%%%%%%%%%%%%%%%%% Semantic Grammar for Genomics %%%%%%%%%%%%%%%%%%%%%%%%%%%%
%                                                                              %
%     Written by Carol Friedman for the MedLEE System                          %
%                                                                              %
%     Queens College of the City University of New York                        %
%                                                                              %
%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%
% Highest Level Predicate - sem_sent - 1st arg. is target structure            %
%                                    - 2nd arg. is a list of words in sentence%
%                                    - 3rd arg. is '[]'                        %
% Target structure: a frame or set of connected frames:                        %
%          the frame describes an action or several related actions;           %
%          an action frame is a list consisting of the symbol 'action'         %
%          followed by the code for the action and arguments.                  %
%          The arguments are either substances or actions;                     %
%          each substance slot consists of the name of the type of             %
%          substance followed by the value for the substance;                  %
%          the substance slot may contain slots for several substances.        %
% Examples:                                                                    %
% Blocking of il-2 gene transcription by activated rap1.                       %
% [action,inactivate,[protein,Rap1,[state,active]],                            %
%                    [action,transcribe,[x],[gene,interleukin-2]]]             %
%                                                                              %
% The adapter protein crkl was associated with both phosphorylated cbl and the%
% guanidine nucleotide-releasing factor c3g.                                   %
% [action,attach,[protein,CrkL],                                               %
%                [relation,and,[protein,Cbl,[state,phosphorylated]],           %
%                              [protein,guanidine nucleotide-releasing factor C3G,
%                                       [state,phosphorylated]]]]              %
%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%
%  fail an unknown predicate
:- unknown(_,fail).
:- op(900,  fy, [not,once]).  %  same priority and type as \+
:- op(700, xfx, [\=,~=]).     %  same priority and type as = or ==
% snoop is generally used to find input string when using a DCG
%       the input string is used for constraints
snoop(A,B,A,B).

sem_sent(P,Semlist,X) -->
        {assert(addstotal(0))},
        sem_parse(P,Semlist,X).
sem_parse(Target,Semlist) -->
        sem_patterns(P,Semlist).
sem_parse(Target,Semlist,X) -->
        sem_patterns(P,Semlist),
        sem_endornot(P,Target,X).

sem_parse([failure],_,X,_,_) :-
        addstotal(X).
sem_endornot(P,P,X)  -->   % P is target if there is an endmark
```

Appendix D

```
        sem_endmark,
        {addstotal(X)}.    % X is number of times reached endmark
sem_endornot(_,_,_,_,_)  :-  % did not reach endmark; update count and fail
        uptotal, fail.
sem_endornot(_,[failure],X,_,_) :-
        addstotal(X),  % X is number of times reached
        X >= 50.


% Finding patterns


sem_patterns(F,Semlist) -->
        pattern(F1,Semlist),
        {F1 \= []},          % 1st finding should not be empty
        morepattern(R,F2,Semlist), % connected patterns
        {getrelation(R,F1,F2,F)}.


/*************************************************************************
* The action pattern types are: pattern, nounactionpatt, actpatt, and    *
* nounactpatt.                                                           *
* pattern  --> actionarg(A1)                                             *
*              active or passive verb                                    *
*              actionarg(A2).                                            *
* pattern  --> nounactionpatt.                                           *
* pattern -->  actpatt.                                                  *
*************************************************************************/

% pattern is saved in a symbol table (st); check for success/failure 1st
% Case where pattern is in st and has been successful
pattern(Fmt,_) --> checkst(pattern,_,s,Fmt).
% Case where pattern is in st as a failure.
pattern(_,_) --> checkst(pattern,_,f,_), {!, fail}.

% pattern 5: an action pattern with a nominal verb
% Ps1 cleavage by zvad.
% apoptosis-induced cleavage of PS2 by zDEVD.
pattern(F,Semlist) -->
     snoop(S0,S0),
   { \+ checkst(pattern,5,_,_,S0,_),
     actionchk(Semlist) },
     nounactionpatt(F),
     snoop(S,S),
   { addst(pattern,5,s,F,S0,S)
  }.


% pattern 1: an action/substance acts on an action/substance
% the activation of rap1 inhibits the expression of il-2
% rap1 functions as a negative regulator of tcr-mediated il-2 gene
% transcription.
pattern(F,Semlist) -->    snoop(S0,S0), % S0 is the input string
   {  \+ checkst(pattern,1,_,_,S0,_),
     actionchk(Semlist),
     connectchk(Semlist)  },
     actionarg(A1),
```

```
      connectact(Sem,[v,vp,ved],Target,Features),
      actionarg(A2),
      snoop(S,S),  %ending sentence list
    { member(def, Features),
      modlist([A1,A2,Site],Mods);
      member(rev,Features),
      modlist([A2,A1,Site],Mods)),
      frame(F,action,Target,Mods),
      addst(pattern,1,s,F,S0,S)
    }.

% pattern 2: an action/substance was acted on by an action/substance
% The aggregation of bad was suppressed.
% The aggregation of bad was suppressed by the phosphorylation of jnk.
% Grb2 was associated with Cbl.
% Apoptosis-associated cleavage of endogenous PS1 was blocked by the
% treatment with zVAD.
pattern(F,Semlist) -->
      snoop(S0,S0), % S0 is the input string
     { \+ checkst(pattern,2,_,_,S0,_),
       actionchk(Semlist),
       connectchk(Semlist) },
       actionarg(A2),
       sem_beterm(_),   % was
       connectact(Sem,[ven],Target,Features), %activated
       optbyarg(A1),
       snoop(S,S),  %ending sentence list
    { (member(def, Features),
       modlist([A1,A2,Site],Mods);
       member(rev,Features),
       modlist([A2,A1,Site],Mods)),
       frame(F,action,Target,Mods),
       addst(pattern,2,s,F,S0,S)
    }.

% pattern 3: an action/substance acted on an action/substance
% bad induced phosphorylation of fyn.
% tcr and cd28-mediated il-2 transcription.
pattern(F,Semlist) -->
      snoop(S0,S0),
    { \+ checkst(pattern, 3,_,_,S0,_),
      actionchk(Semlist),
      connectchk(Semlist) },
      actionarg(A1),     % substance or basic action
    % optdash,
      connectacts(Sem,[vp,ven,ved],Target,Features),    % 'activated'
    % optof,
      actionarg(A2), % had pattern here
      snoop(S,S),
   { (member(def, Features),
      modlist([A1,A2,Site],Mods);
      member(rev,Features),
      modlist([A2,A1,Site],Mods)),
      frame(F,action,Target,Mods),
      addst(pattern,3,s,F,S0,S)
   }.
```

```
% pattern 4:  a simple action pattern with an active verb.
% Activated Raf-1 phosphorylates MEK-1.
pattern(F,Semlist) -->
      snoop(S0,S0),
      %check that sentence has an action word/phrase
    { \+ checkst(pattern, 4,_,_,S0,_),
      actionchk(Semlist) },
      actpatt(F),
      snoop(S,S),
    { addst(pattern,4,s,F,S0,S)
   }.

% no more patterns - save failure
pattern(_,_) -->  addst(pattern,0,f,_), {!, fail}.

%  sem_morepattern(-Rel,-P,+Semlist,+S0,+S):
%       Rel is a relation and its value frame;
%       P is the remaining patterns, Semlist is the list of semantic classes
%       in sentence
% if have a series of ','s, use the relation "and" or "or" if in the nest
% and make that the relation
morepattern(R,F,Semlist) -->
        sem_relation(R1,Mod1),    %relation and modifiers
        sem_patterns(F,Semlist),
        {( frame(F,rel,Conj2,_),  % F contains nested relation
            (Conj2 = and; Conj2 = or), frame(R1,rel,',',_), % R1 relation frame
           frame(R,rel,Conj2,_)   % value of relation is Conj2
           ;
           R1 \= [],  % where do Type, Value and Mods2 come from?
          frame(R1,Type,Value,Mod2),  % get components of original relation
          mergemods(Mod1,Mod2,Mods),
          ( Mods = [], frame(R,rel,Value,[]), !;
            %frame(R,rel,[Value|Mods],[])  % make it rel connector with rel mod
            R = [rel,[Value|Mods]]
          )
         )
        }.
% no more findings
morepattern([],[],_,S,S).

% actionarg is the argument of pattern
% actionarg is either a substance or a basic action

% actionarg is saved in a symbol table (st); check for success/failure 1st
% Case where actionarg is in st and have been successful
actionarg(A) --> checkst(actionarg,_,s,A).
% Case where actionarg is in st as a failure.
actionarg(_) --> checkst(actionarg,_,f,_), {!, fail}.

% actionarg 1: a substance or substances
% Rap1, active Rap1, Cbl and Crk1
actionarg(A) --> snoop(S0,S0), % S0 is the input string
              { \+ checkst(actionarg,1,_,_,S0,_)},
                substances(A),
                snoop(S,S),
              { addst(actionarg,1,s,A,S0,S) }.
```

```
% actionarg 2: a process like apoptosis, or a disease
actionarg(A) --> snoop(S0,S0), % S0 is the input string
                 { \+ checkst(actionarg,2,_,_,S0,_)},
                   processpatt(A),
                   snoop(S,S),
                 { addst(actionarg,2,s,A,S0,S)
    }.

% actionarg 3: a nominal action pattern
% Etoposide-induced apoptosis.
% Etoposide-induced PS1 cleavage by zVAD.
actionarg(A) --> snoop(S0,S0), % S0 is the input string
                 { \+ checkst(actionarg,3,_,_,S0,_)},
                   nounactionpatt(A),
                   snoop(S,S),
                   {addst(actionarg,3,s,A,S0,S)
     }.

% actionarg 4: the object of the nominal action is an actionarg
% Blocking of IL-2 Gene transcription by activated rap1.
actionarg(A) --> snoop(S0,S0), % S0 is the input string
                   { \+ checkst(actionarg,4 ,_,_,S0,_) },
                     action(Sem,[n,ving],Target,Features),
                     [of],
                     actionarg(A1),
                     optbyagent(A2),
                     snoop(S,S),
                   { (member(def, Features),
                     modlist([A1,A2],Mods);
                     member(rev,Features),
                     modlist([A2,A1],Mods)),
                     frame(A,action,Target,Mods),
                     addst(actionarg,4,s,A,S0,S)
      }.


% no more actionarg - save failure
actionarg(_) -->  addst(actionarg,0,f,_), {!, fail}.

% nounactionpatt is a nominal action pattern which allows for left and right
% modifiers
% Il-2 gene transcription mediated by tcr and cd28 was inhibited by rap1.
% Activated rap1 functions as a negative regulator of tcr and cd-28-mediated
il_2 transcription.
% nounactionpatt is saved in a symbol table (st); check for success/failure 1st
% Case where nounactionpatt is in st and has been successful
nounactionpatt(A) --> checkst(nounactionpatt,_,s,A).
% Case where nounaction patt is in st as a failure.
nounactionpatt(_) --> checkst(nounactionpatt,_,f,_), {!, fail}.

nounactionpatt(P) --> snoop(S0,S0),      % S0 is the input string
                      { \+ checkst(nounactionpatt,1 ,_,_,S0,_)},
                        actionlmod(L,Syn1),
                        nounactionunit(A),
                        actionrmod(R, Syn2),
```

```
                    snoop(S,S),
                  { (Syn1 = ved, append(R,[A], RA),
                     append(L, RA, P);
                     Syn1 = ving, append(R, [A], RA),
                     L = [action,Verb,Object],
                     modlist(RA, Object, Mods),
                     frame(P, action, Verb, Mods)),
                     addst(nounactionpatt,1,s,P,S0,S) }.
% no more nounactionpatt - save failure
nounactionpatt(_) -->  addst(nounactionpatt,0,f,_), {!, fail}.

% the central unit of the nounactionpatt is a nounactpatt or a process
nounactionunit(A) --> nounactpatt(A).
nounactionunit(A) --> process(A).

% left modifiers of nounactpatt
% Zvad-inhibited cleavage pf Ps1
actionlmod(L,ved) --> substances(S),
                      optdash,
                      action(Sem,[ved],Target,Features ),
                    { frame(L, action, Target, [S]) }.

% apoptosis induced cleavage of ps2
actionlmod(L,ved) --> process(S),
                      optdash,
                      action(Sem,[ved],Target,Features ),
                    { frame(L, action, Target, [S]) }.


% apoptosis causing cleavage of Ps1 by Zvad.
% need to invert the order of nounactpatt and actionlmod
actionlmod(L,ving) --> processobject(A),    % process or nounacpatt,
                       action(Sem,[ving],Target,Features),
                     { frame(L,action, Target,A) }.

actionlmod([],_) --> [].

actionrmod(R,ved) --> action(Sem,[ved],Target,Features),
                      byagent(A),  % may have to add ving to actionrmod
                    {  frame(R,action, Sem, A) }.
actionrmod([],_) --> [].


%
% actpatt parses a simple action between substances expressed by an active verb
%
% actpatt is saved in a symbol table (st); check for success/failure % % 1st
% Case where actpatt is in st and has been successful
actpatt(F) --> checkst(actpatt,_,s,F).
% Case where actpatt is in st as a failure.
actpatt(_) --> checkst(actpatt,_,f,_), {!, fail}.

% actpatt 1: substance acts on substance
% PDK1 phosphorylates p70s6k at Thr229
actpatt(F) -->
    snoop(S0,S0), % S0 is the input string
  { \+ checkst(actpatt,1 ,_,_,S0,_)},
```

```
    substances(A1),
    sem_whichrel,      % opt 'that'
    action(Semclass,[vp,ved],Target,Features),
    prepopt,  % added prepopt to allow action 'to' and 'with' substance
    substances(A2),
    siteinfo(Site),
    snoop(S,S),
  { (member(def, Features),
    modlist([A1,A2,Site],Mods);
    member(rev,Features),
    modlist([A2,A1,Site],Mods)),
    frame(F,action,Target,Mods),
    addst(actpatt,1 ,s,F,S0,S)
  }.

% acpatt 2:
% Substance was bound by Substance
% Substance was associated to substance.
% F can give either first or second place to the second argument;
% a byagent gets first position; prepagent gets second.
% Phosphorylated Fyn was associated with Cbl.

actpatt(F) -->
    snoop(S0,S0), % S0 is the input string
 {  \+ checkst(actpatt,2,_,_,S0,_)},
    substances(A1),
    sem_beterm(_),
    action(Semclass,[ven],Target,Features),
    optbyorprepagent(Position,A2),
    snoop(S,S),
 { (member(def, Features),
   (Position=second, modlist([A1,A2,Site],Mods);
    Position= first, modlist([A2,A1,Site],Mods));
    member(rev,Features),
   (Position=second, modlist([A2,A1,Site],Mods);
    Position= first, modlist([A1,A2,Site],Mods))),
    frame(F,action,Target,Mods),
    addst(actpatt,2,s,F,S0,S)
 }.

% no more actpatt - save failure
actpatt(_) -->  addst(actpatt,0,f,_), {!, fail}.

%
% nounactpatt parses a simple action between substances expressed by a nominal
% verb
%
% nounactpatt is saved in a symbol table (st); check for success/failure 1st
% Case where nounactpatt is in st and have been successful
nounactpatt(Fmt) --> checkst(nounactpatt,_,s,Fmt).
% Case where nounactpatt is in st as a failure.
nounactpatt(_) --> checkst(nounactpatt,_,f,_), {!, fail}.

% nounactpatt 1:
% Jnk phosphorylation of Bad
nounactpatt(F) -->
    snoop(S0,S0), % S0 is the input string
```

```
   { \+ checkst(nounactpatt,1,_,_,S0,_) },
     substances(A1),
     {aminoacidtest(A1)},
     optdash,
     action(Semclass,[n],Target,Features),
     ofobject(A2),
%    siteinfo(Site),
     snoop(S,S),
    {(member(def, Features),
      modlist([A1,A2,Site],Mods);
      member(rev,Features),
      modlist([A2,A1,Site],Mods)),
      frame(F,action,Target,Mods),
      addst(nounactpatt,1,s,F,S0,S)
    }.

% nounactpatt 2: the binding of substance and substance
% association of Fyn and Cbl.
% the reason for having this as a separate pattern is to
% prevent 'Fyn and Cbl' from being parsed together as substances
nounactpatt(F) -->
     snoop(S0,S0), % S0 is the input string
  {  \+ checkst(nounactpatt,2 ,_,_,S0,_) },
     action(attach,[ving,n],Target,Features),
     ofobject1(A1),
     andobject(A2),
  %  siteinfo(Site),
     snoop(S,S),
  {  modlist([A1,A2,Site],Mods),
     frame(F,action,Target,Mods),
     addst(nounactpatt,2,s,F,S0,S)
    }.

% nounactpatt 3:
% The cleavage of protein by substance.
% Association of phosphorylated Fyn with Cbl
% Tyrosine phosphorylation of Cbl by kinase
% optbyorprepagent determines the order of arguments; byagent is placed first;
% prepagent is placed second

nounactpatt(F) -->
    snoop(S0,S0), % S0 is the input string
     { \+ checkst(nounactpatt,3 ,_,_,S0,_)},
     actionof(F),
     snoop(S,S),
   { addst(nounactpatt,3 ,s,F,S0,S) }.

actionof(F) -->
     siteinfo(Site),
     action(Semclass,[ving,n],Target,Features),
     optofobject(A1),
     optbyorprepagent(Position,A2),
     snoop(S,S),
   { (member(def, Features),
     (Position=second, modlist([A1,A2,Site],Mods);
      Position= first, modlist([A2,A1,Site],Mods));
      member(rev,Features),
```

```
    (Position=second, modlist([A2,A1,Site],Mods);
     Position= first, modlist([A1,A2,Site],Mods))),
     frame(F,action,Target,Mods)
  }.

% nounactpatt 4:
% Fyn association with Cbl.
nounactpatt(F) -->
    snoop(S0,S0), % S0 is the input string
  { \+ checkst(nounactpatt,4,_,_,S0,_) },
    substances(A1),
    action(Semclass,[ving,n],Target,Features),
    withobject(A2),
  % siteinfo(Site),
    snoop(S,S),
 {  modlist([A1,A2,Site],Mods),
    frame(F,action,Target,Mods),
    addst(nounactpatt,4,s,F,S0,S)
 }.

aminoacidtest(X) :-  X \= [aminoacid|_].

% nounactpatt 5:
% IL-2 gene transcription
% Cbl phosphorylation [by substance or action]
nounactpatt(F) -->
    snoop(S0,S0), % S0 is the input string
{   \+ checkst(nounactpatt,5 ,_,_,S0,_) },
    substances(A2),
    optdash,
    action(Semclass,[n],Target,Features),
    optbyagent(A1),
 %  siteinfo(Site),
    snoop(S,S),
 { (member(def, Features),
    modlist([A1,A2,Site],Mods);
    member(rev,Features),
    modlist([A2,A1,Site],Mods)),
    frame(F,action,Target,Mods),
    addst(nounactpatt,5 ,s,F,S0,S)
 }.

% nounactpatt 6:
% fyn-cbl association.
nounactpatt(F) -->
    snoop(S0,S0), % S0 is the input string
{   \+ checkst(nounactpatt,6 ,_,_,S0,_) },
    substances(A1),
    optdash,
    substances(A2),
    action(Semclass,[n,ving],Target,Features),
 %  siteinfo(Site),
    snoop(S,S),
  { modlist([A1,A2,Site],Mods),
    frame(F,action,Target,Mods),
    addst(nounactpatt,6,s,F,S0,S)
  }.
```

```
% nounactpatt 7:
% Cbl phosphorylated by fyn.
nounactpatt(F) -->
    snoop(S0,S0), % S0 is the input string
    { \+ checkst(nounactpatt,7 ,_,_,S0,_)},
    substances(A1),
    action(Semclass,[ven],Target,Features),
    [by],
    substances(A2),
 %  siteinfo(Site),
    snoop(S,S),
 %          {(member(def, Features),
    { modlist([A2,A1,Site],Mods),
 %           member(rev,Features),
 %           modlist([A1,A2,Site],Mods)),
      frame(F,action,Target,Mods),
      addst(nounactpatt,7,s,F,S0,S)
    }.

% no more nounactpatt - save failure
nounactpatt(_) --> addst(nounactpatt,0,f,_), {!, fail}.


connectact(Sem,Syn,Target,Features) -->
      action(Sem,Syn,Target,Features),
     {member(Sem,[cause,cause1,activate,inactivate,signal,substitute,promote])}.

connectacts(Sem,Syn,Target,Features) -->
      connectact(Sem,Syn,Target,Features).

% aminoacid like tyrosine : ex.: tyrosine Cbl phosphorylation
% at position 201 Thr
siteinfo(S)  --> aminoacid(A),
                 {frame(S,site,[A],[])} .
siteinfo(S)  -->
                sitepreps,  % 'in', 'at'
                position(S).
siteinfo([]) --> [].
sitepreps    --> prepterm(in,_).
sitepreps    --> prepterm(at,_).
position(S)  --> [position],
                 sem_integerterm(I),
               { frame(S,site,I,[])}.


% The definitions of actions refer to the lexicons lexsynact.pl and lexsemact.pl
% Sem is the semantic class; Syn is the syntactic class
% F is the target
% oneaction was added for use with moreaction to allow parsing of conjoined
% actions

oneaction(activate,Syn,F,Features)     --> activateterm(Syn,F,Features),{!}.
oneaction(attach,Syn,F,Features)       --> attachterm(Syn,F,Features),{!}.
oneaction(breakbond,Syn,F,Features)    --> breakbondterm(Syn,F,Features),{!}.
```

```
oneaction(createbond,Syn,F,Features)  --> createbondterm(Syn,F,Features),{!}.
oneaction(inactivate,Syn,F,Features)  --> inactivateterm(Syn,F,Features),{!}.
oneaction(react,Syn,F,Features)       --> reactterm(Syn,F,Features),{!}.
oneaction(release, Syn,F,Features)     --> releaseterm(Syn,F,Features),{!}.
oneaction(signal,Syn,F,Features)      --> signalterm(Syn,F,Features),{!}.
oneaction(substitute,Syn,F,Features)  --> substituteterm(Syn,F,Features),{!}.
oneaction(transcribe,Syn,F,Features)  --> transcribeterm(Syn,F,Features),{!}.
oneaction(promote,Syn,F,Features)     --> promoteterm(Syn,F,Features),{!}.
oneaction(generate,Syn,F,Features)    --> generateterm(Syn,F,Features),{!}.
oneaction(cause,Syn,F,Features)    -->    causeterm(Syn,F,Features),{!}.

action(activate,Syn,F,Features)    --> activateterm(Syn,A1,Features),
                          moreaction(Conj,Args),
                         {Conj = [],F =A1;
                         Conj\=[], mergemods([[action,A1]],Args,Actions),
                         frame(F1,relation, Conj,Actions), F = [F1]}.
action(attach,Syn,F,Features)      --> attachterm(Syn,A1 ,Features),
                         moreaction(Conj,Args),
                         {Conj = [],F =A1;
                         Conj\=[], mergemods([[action,A1]],Args,Actions),
                         frame(F1,relation, Conj,Actions), F = [F1]}.
action(breakbond,Syn,F,Features)   --> breakbondterm(Syn,F,Features),
                         moreaction(Conj,Args),
                         {Conj = [],F =A1;
                         Conj\=[], mergemods([[action,A1]],Args,Actions),
                         frame(F1,relation, Conj,Actions), F = [F1]}.
action(createbond,Syn,F,Features)  --> createbondterm(Syn,F,Features),
                         moreaction(Conj,Args),
                         {Conj = [],F =A1;
                         Conj\=[], mergemods([[action,A1]],Args,Actions),
                         frame(F1,relation, Conj,Actions), F = [F1]}.
action(inactivate,Syn,F,Features)  --> inactivateterm(Syn,F,Features),
                         moreaction(Conj,Args),
                         {Conj = [],F =A1;
                         Conj\=[], mergemods([[action,A1]],Args,Actions),
                         frame(F1,relation, Conj,Actions), F = [F1]}.
action(react,Syn,F,Features)       --> reactterm(Syn,F,Features),
                         moreaction(Conj,Args),
                         {Conj = [],F =A1;
                         Conj\=[], mergemods([[action,A1]],Args,Actions),
                         frame(F1,relation, Conj,Actions), F = [F1]}.
action(release, Syn,F,Features)     --> releaseterm(Syn,F,Features),
                         moreaction(Conj,Args),
                         {Conj = [],F =A1;
                         Conj\=[], mergemods([[action,A1]],Args,Actions),
                         frame(F1,relation, Conj,Actions), F = [F1]}.
action(signal,Syn,F,Features)      --> signalterm(Syn,F,Features),
                         moreaction(Conj,Args),
                         {Conj = [],F =A1;
                         Conj\=[], mergemods([[action,A1]],Args,Actions),
                         frame(F1,relation, Conj,Actions), F = [F1]}.
action(substitute,Syn,F,Features)  --> substituteterm(Syn,F,Features),
                         moreaction(Conj,Args),
                         {Conj = [],F =A1;
                         Conj\=[], mergemods([[action,A1]],Args,Actions),
                         frame(F1,relation, Conj,Actions), F = [F1]}.
action(transcribe,Syn,F,Features)  --> transcribeterm(Syn,F,Features),
```

```
                              moreaction(Conj,Args),
                              {Conj = [],F =A1;
                              Conj\=[], mergemods([[action,A1]],Args,Actions),
                              frame(F1,relation, Conj,Actions), F = [F1]}.
action(promote,Syn,F,Features)      --> promoteterm(Syn,F,Features),
                              moreaction(Conj,Args),
                              {Conj = [],F =A1;
                              Conj\=[], mergemods([[action,A1]],Args,Actions),
                              frame(F1,relation, Conj,Actions), F = [F1]}.
action(generate,Syn,F,Features)     --> generateterm(Syn,F,Features),
                              moreaction(Conj,Args),
                              {Conj = [],F =A1;
                              Conj\=[], mergemods([[action,A1]],Args,Actions),
                              frame(F1,relation, Conj,Actions), F = [F1]}.
action(cause,Syn,F,Features)     --> causeterm(Syn,F,Features),
                              moreaction(Conj,Args),
                              {Conj = [],F =A1;
                              Conj\=[], mergemods([[action,A1]],Args,Actions),
                              frame(F1,relation, Conj,Actions), F = [F1]}.

% binds, phosphorylates and activates
moreaction(Conj,Args) --> sem_conjrest(Conj1),
                              oneaction(Sem,Syn,A,Features),
                              moreaction(Conj2,Alist),
                             {Conj2 = [], Alist=[],Conj=Conj1, Args = [[action,A]];
                              Conj2 \= [], Conj = Conj2,
                              addmod([action,A],Alist,Args) }.
moreaction([],[],S,S).


passiveconnect(Sem,[ven],Target,Features) -->
                  sem_beterm(_),
                  connectact(Sem,[ven],Target,Features).


processpatt(A) --> disease(A).
processpatt(A) --> process(A).

optbyorprepagent(first,A)  --> byagent(A).
optbyorprepagent(second,A) --> prepagent(A).
optbyorprepagent(first,A)  --> [], {A = x}.

byorprepagent(first,A)  --> byagent(A).
byorprepagent(second,A) --> prepagent(A).

optbyagent(A) --> byagent(A).
optbyagent(A) --> [], {A = [x]}.

byagent(A) --> [by],
               substances(A).
byagent(A) --> [by],
               nounactionpatt(A).
prepagent(A) --> withobject(A).
prepagent(A) --> toobject(A).
% prepagent(A) --> andobject(A).
prepagent(A) --> ofobject(A).
```

```
% optprepagent(A) --> byagent(A).
optprepagent(A) --> ofobject(A).
optprepagent(A) --> withobject(A).
optprepagent(A) --> toobject(A).
optprepagent(A) --> andobject(A).
optprepagent(A) --> [], {A= [x]}.

ofobject(A) --> [of],
                nounactionpatt(A).
ofobject(A) --> [of],
                substances(A).
ofobject(A) --> [of],
                actionof(A).
ofobject1(A) --> [of],substance(A).  % to parse Binding of Fyn and Bad.
optofobject(A) --> ofobject(A).
optofobject([x]) --> [].

processobject(A) --> process(A). % can be expanded to nounactpatt, etc.

% optwithobject(A) --> withobject(A).
% optwithobject(A) --> [], {A = [x]}.
withobject(A) --> [with], substances(A).
toobject(A)   --> [to], substances(A).
andobject(A)  --> [and], substances(A).
prepobject(A) --> [to],substances(A).
prepobject(A) --> [with], substances(A).

optbyarg(A) --> [by],
                actionarg(A).
optbyarg(A) --> substances(A).
optbyarg(A) --> [], {A = ['substance unknown']}.

prepopt --> [to].
prepopt --> [with].
prepopt --> [by].
prepopt --> [of].
prepopt --> [].

% toopt
toopt --> [to].
toopt --> [].
% withopt
withopt --> [with].
withopt --> [].


optdash     --> ['-'].
optdash     --> [ ].
optof         --> [of].
optof         --> [ ].
/* optactionarg(A) --> actionarg(A).
optactionarg([]) --> []. */

optactionarg(A) -->
      actionarg(A).
```

```
% there is no further argument
optactionarg(A) -->
    [],
    {A = [] }.

% substances(F) --> substance(F).
% substances(F) --> substance(P1),
%             moresubstances(Conj,Plist),
%              { Conj = [], Plist = [], F = P1 ;
%              Conj \= [],
%            mergemods(P1,Plist,Args),
%                frame(F,relation,Conj,Args)
%              }.
% substances(F) --> substanceswithmods(F).
% substances(A) -->
%                  proteins(A).
% subswithmods.txt

% substances is saved in a symbol table (st);
% check for success/failure 1st
% Case where substances is in st and has been successful
substances(Fmt) --> checkst(substances,_,s,Fmt).
% Case where substance is in st as a failure.
substances(_) --> checkst(substances,_,f,_), {!, fail}.

substances(F) -->
        snoop(S0,S0),
      { \+ checkst(substances,1,s,_,S0,_)},
        lmods(Lmods),  % left modifiers
        (severalsubstances([relation,Conj,First|Rest]), % conjoined substances
        rmods(Rmods),     % right modifiers
% create list of lists containing distributed mods. of substances
      { distributesubs(Dist,[First|Rest],Lmods,Rmods),
% check Lmods - "no" F1 or F2 should be changed to no F1 and no F2
        fixconj(Lmods,[rel,Conj],[rel,C2]),
       %splice([Conj,Dist],F)
        frame(F,relation,C2,Dist)};
% substances and modifiers without conjunction
        substance(D1),
        rmods(Rmods),
        {D1 = [Type1, Substance1|ModsD1],
        delete(ModsD1, [], ModsD2),
        append([Lmods,Rmods],ModsD2,Allmods1),
        delete(Allmods1, [], Allmods2),
        frame(F,Type1,Substance1,Allmods2)}),
        snoop(S,S),
       {addst(substances,1,s,F,S0,S)}.

/* substances(F) --> snoop(S0,S0),
                 {\+ checkst(substances,3 ,s,_,S0,_)},
                  complex(F),
                 {addst(substances,3,s,F,S0,S)}.
*/
% no more substances- save failure
substances(_) -->  addst(substances,0,f,_), {!, fail}.
```

```
severalsubstances(F) --> substance(P1),
                         moresubstances(Conj,Plist),
                       {  Conj = [], Plist = [], F = P1 ;
                          Conj \= [],
                          addmod(P1,Plist,Args),
                          frame(F,relation,Conj,Args)
                        }.

%  ' X, Y, and Z'
 moresubstances(Conj,Args) --> sem_conjrest(Conj1),
                               substance(P1),
                               moresubstances(Conj2,Plist),
                             { Conj2 = [], Plist = [], Conj = Conj1, Args = [P1];
                               Conj2 \= [] ,Conj2\= /, Conj = Conj2,
                               addmod(P1,Plist,Args)
                              }.

% to allow for substances with modifiers
moresubstances(Conj1,Args) --> sem_conjrest(Conj1),
                                    substances(Args),{!}.


moresubstances([],[])  --> [].  % no conjunction



% distributesubs
% distributes left mods and right mods over list of findings creating
% list of lists of findings with mods
distributesubs([],[],_,_) :- !.
distributesubs(Dist,[D1|Tail],Lmods,Rmods) :-
        distributesubs(Dist2,Tail,Lmods,Rmods), %distributed for remainder
        D1 = [Type1, Substance1|ModsD1],
        append([Lmods,Rmods],ModsD1,Allmods1),
        delete(Allmods1,[],Allmods2),
        frame(D,Type1,Substance1,Allmods2),
        append([D],Dist2,Dist). % Combine findings to get list of findings

lmods(A) --> stateterm(F),
             {frame(A, state, F, [])}.
lmods([]) --> sem_measure(_).
lmods([]) --> [].
rmods([]) --> [].
stateterm(F) --> acclex(state, F).
% for past participle of createbond and breakbond actions, the target
% is the word. ex.: phosphorylated, dephosphorylated, methylated
stateterm(F) -->
             snoop(S0,S0), % get the initial string
             createbondterm([ven], _,_),
             {S0 = [F|_]}. %get the first word of the string
stateterm(F) -->
             snoop(S0,S0), % get the initial string
             breakbondterm([ven], _,_),
             {S0 = [F|_]}. %get the first word of the string

% may have to add attachterm for 'bound'
```

```
% Taken from MedLEE grammar to handle '3 cm'
sem_measure(M) -->
                    sem_premeasure,
                    sem_quantityterm(N),
                    optdash,
                    sem_measureterm(Unit),
                   { frame(M,measure,[N,Unit],[]) }.
% complex predicates added November 8, 1999
% CrkL-C3G complex
% ras: raf-1 association
% ras: raf-1 complexes
% shc-grb2-sos
% TCR/CD3 complex
% p/CAF-p/CIP-CBP/p300-SRC-1 complex
% Ras:Raf-1 complexes
complex(C)  -->   proteins(P),
                  {P = [A,B|_],A \= [], B \= []},
                   optcomplexword,
                  { frame(C, complex,[P], []) }.

% a complex of NFAT4 with calcineurin
complex(C)   -->   complexword,
                   complexarg(A),
                   {frame(C, complex,[A],[])}.

complexarg(A) --> [of], proteins(A).
complexarg(A) --> [between], proteins(A).
% a complex between MyD88, IRAK-2, and the IL-1Rs
complexarg(A) --> action(contain), proteins(A).
% Complexes containing BOB.1/OBF.1 and Oct proteins

proteins(P)  --> protein(A),
                 moreproteins(P1),
                 {(A\=[]; append([A],P1,P))}.

moreproteins(A) --> proteinconnector,
                    proteins(A).

moreproteins([]) --> [].
proteinconnector  -->   ['-'].
proteinconnector  -->   ['/'].
proteinconnector  -->   [':'].
% connector  -->    [','].    taken out not to conflict with relation in
% connector  -->    [and].                                    moresubstances
proteinconnector(C)  --> [with].
optconnector -->    proteinconnector.
optconnector  -->   [].

complexword  -->  [complex].
complexword  -->  [complexes].
complexword  -->  ['signaling complexes'].

optcomplexword     --> complexword.
optcomplexword     --> [].


substance(A) --> protein(A).
```

```
substance(A) --> cell(A).
substance(A) --> species(A).
substance(A) --> structure(A).
substance(A) --> domain(A).
substance(A) --> gene(A).
substance(A) --> geneorprotein(A).
substance(A) --> aminoacid(A).
substance(A) --> smallmolecule(A).
substance(A) --> matter(A).
substance(A) --> proteinsite(A).
substance(A) --> disease(A).          % this will be modified later
substance(A) --> complex(A).

protein(A) -->
    proteinterm(P),
    {frame(A,protein,P,[])}.

complex(A) -->
    complexterm(P),
    {frame(A,complex,P,[])}.

cell(A) -->
    cellterm(P),
    {frame(A,cell,P,[])}.

species(A) -->
    speciesterm(P),
    {frame(A,species,P,[])}.

structure(A) -->
    structureterm(P),
    {frame(A,structure,P,[])}.

domain(A) -->
    domainterm(P),
    {frame(A,domain,P,[])}.

gene(A) -->
    geneterm(P),
    {frame(A,gene,P,[])}.

geneorprotein(A) -->
    gpterm(P),
    [X],
    {(X = gene, frame(A, gene, P, []);
      X = protein, frame(A, protein, P, []);
      X\= gene, X \= protein, frame(A, geneorprotein, P, []))}.

aminoacid(A) -->
    aminoacidterm(P),
    {frame(A,aminoacid,P,[])}.

smallmolecule(A) -->
    smallmoleculeterm(P),
    {frame(A,'small molecule',P,[])}.

matter(A) -->
```

```
    matterterm(P),
    {frame(A,substance,P,[])}.

proteinsite(A) -->
    proteinsiteterm(P),
    {frame(A,'protein site',P,[])}.

disease(A) -->
    diseaseterm(P),
    {frame(A,disease,P,[])}.
process(A) -->
     processterm(Syn,F,Features),
     {frame(A, process, F,[]),!}.
process(A) -->
     processterm(P),
     {frame(A, process, P, []),!}.


% terminals
proteinterm(F)          --> acclex(protein,F).
complexterm(F)          --> acclex(complex,F).
cellterm(F)             --> acclex(cell,F).
speciesterm(F)          --> acclex(species,F).
structureterm(F)        --> acclex(structure,F).
domainterm(F)           --> acclex(domain,F).
geneterm(F)             --> acclex(gene,F).
gpterm(F)               --> acclex(gp,F).
aminoacidterm(F)        --> acclex(aminoacid,F).
smallmoleculeterm(F)    --> acclex(smallmolecule,F).
matterterm(F)           --> acclex(substance,F).
proteinsiteterm(F)      --> acclex(proteinsite,F).
diseaseterm(F)          --> acclex(disease,F).
processterm(F)          --> acclex(process, F).

% action(activate,Syn,F,Features)     --> activateterm(Syn,F,Features).

activateterm(Syn,F,Features)   --> acclexss(activate, Syn,F,Features).
attachterm(Syn,F,Features)     --> acclexss(attach, Syn,F,Features).
breakbondterm(Syn,F,Features)  --> acclexss(breakbond, Syn,F,Features).
createbondterm(Syn,F,Features)--> acclexss(createbond, Syn,F,Features).
inactivateterm(Syn,F,Features)--> acclexss(inactivate, Syn,F,Features).
reactterm(Syn,F,Features)      --> acclexss(react, Syn,F,Features).
releaseterm(Syn,F,Features)    --> acclexss(release, Syn,F,Features).
signalterm(Syn,F,Features)     --> acclexss(signal, Syn,F,Features).
substituteterm(Syn,F,Features)--> acclexss(substitute, Syn,F,Features).
transcribeterm(Syn,F,Features)--> acclexss(transcribe, Syn,F,Features).
promoteterm(Syn,F,Features)    --> acclexss(promote, Syn,F,Features).
processterm(Syn,F,Features)    --> acclexss(process, Syn, F,Features).
generateterm(Syn,F,Features)   --> acclexss(generate,Syn,F,Features).
causeterm(Syn,F,Features)      --> acclexss(cause,Syn,F,Features).

% Semlist contains a phrase which is an action
actionchk(Semlist) :-
       intersect(Semlist,[attach,cause, createbond, breakbond,activate,
                  inactivate,substitute,transcribe,express,promote,signal]).

% Semlist contains a phrase which is a connector action
```

```
connectchk(Semlist) :- '
        intersect(Semlist, [cause,activate,inactivate,substitute,
                            promote,signal]).


%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%
%                      Genome sectionc: ends here                            %
%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%
% relations are connected by conjunctions, or
%           certain 'conn' prepositions.
% Taken from MedLEE grammar to handle connectives that are conjunctions
%           Ex: "severe markings, possibly from tuberculosis"
sem_relation(F,[]) -->    % relation and modifiers
        sem_commapunc,
        sem_certainty([],C,rel),
        prepterm(P,conn),
        {frame(F,rel,P,C)}.
        %plice([[rel,P],C],R).

%           Ex: "markings, swelling",  "markings and swelling"
sem_relation(R,[]) -->  sem_conjrel(R),
                        sem_commapunc.
%          "density may represent known tumor"

%   "markings, and swelling"
sem_conjrel(F) -->
       sem_commapunc,
       sem_conjterm(Conj),
       {frame(F,rel,Conj,[])}.

sem_conjrest(Conj) -->      % restricted conj, has not sem_relation_showopt
        sem_commapunc,
        sem_conjterm(Conj).
% "markings, swelling"
sem_conjrest(',') -->
      snoop(S0,S0),
        sem_commapunc,
      snoop(S,S),
        {S0 \= S}.
% Treatment of Verbs from MedLEE's Grammar
%             form of "be"
sem_auxverb(B) --> sem_beterm(B).
%             form of "do"
sem_auxverb(B) --> sem_doterm(B).
%             form of "have"
sem_auxverb(B) --> sem_haveterm(B).

sem_recrel --> prepterm(in,_).
sem_recrel --> prepterm(to,_).
% "is not"
sem_auxrel(V) --> sem_auxverb(_),
                  sem_negterm(V).
sem_auxrel(V) --> sem_auxverb(V).
% left modifiers of findings include negation, quantity, certainty, degree, and
%                                     change type modifiers
```

```
sem_integer(W) --> [W],{integer(W)}.
sem_integer(W) --> integerterm(W).
sem_timeunit(T) --> sem_timeunitterm(T).

% From MedLEE grammar - "lasting 2 days", "for 2 days", "times 2 days"
sem_duration(F) -->
       sem_durpreps,
       sem_premeasure,  %about
       sem_timemeasure(T),
       sem_durationmod,  % opt. - "in duration"
       {frame(F,duration,[T],[])}.
sem_duration([],S,S).

sem_durpreps -->[times].
sem_durpreps -->
    prepterm(for,_).
sem_durpreps -->[lasting,for].
sem_durpreps -->[lasting].
sem_durpreps -->[lasted,for].
sem_durpreps -->[lasted].
sem_durationmod -->
         sem_aposts,  %opt. - "'s"
       [duration].
sem_durationmod --> [in], [duration].
sem_durationmod --> [].
sem_aposts --> [''''], [s].
sem_apost --> [].

% sem_frequency taken From MedLEE's grammar
% "two times", "times two", "two times a/per week", "two times daily"
sem_frequency(F) -->
        sem_freqterm(F1),    % "once"
        sem_freqterm(F2),     %  "a day"
        {frame(M,unitval,[F1,F2],[]),
         frame(F,frequency,[M],[])}.

sem_frequency(F) -->
        sem_freqterm(M),    % "qid", "daily"
        {frame(F,frequency,M,[])}.

% "2 times",
sem_frequency(F) -->
        sem_premeasure,
        sem_quantityterm(M),
        sem_times,
      {frame(F,frequency,[M],[])}.

% "times 2"
sem_frequency(Q) -->
        sem_times,
        sem_quantityterm(Q1),
        {frame(Q,frequency,Q1,[])}.
sem_frequency(F) -->
        [q], sem_quantityterm(Q),
             sem_timeunit(T),
        {frame(F,frequency,[unitval,[Q,T]],[])}.
```

```
sem_frequency(F) --> sem_eachevery,
                     sem_quantityterm(Q),
                     sem_timeunit(T),
                    {frame(F,frequency,[unitval,[Q,T,every]],[])}.
sem_frequency(Q) -->    % "second"
        sem_ordinal(O),
        sem_timeopt,
        {frame(Q,frequency,O,[])}.
sem_frequency([],S,S).
sem_timeopt  --> [time].
sem_timeopt  --> [].
sem_eachevery  --> [each].
sem_eachevery  --> [every].
sem_times-->[times].
sem_times-->[x].



% Taken from MedLEE's grammar
 negation modifier - "no" as in "no cardiomegaly"
sem_negation(F) -->
        sem_negterm(N),
        {frame(F,neg,N,[])}.
% negation not present
sem_negation([],S0,S0).

% Taken from MedLEE's grammar
% quantity modifier - "two" as in "two masses"
sem_quantity(F) -->
       snoop(S0,S0),
       { \+ checkst(sem_dates,1,s,_,S0,_) },  % not a legitimate date
       sem_quantityterm(Q),
       sem_quantityrmod(_),       % "2 or 3", "2 to 3"
       {\+ next_wordunit(S0),     % rule out '2 mm'
        frame(F,quantity,Q,[])
       }.
sem_quantity([],S0,S0).



sem_commapunc([',|S],S).
sem_commapunc(S,S).
sem_conjterm(C)      --> acclex(conj,C).
sem_doterm(D)        --> acclex(vdo,D).
sem_endmark([.|S],S).
sem_endmark([;|S],S).
sem_freqterm(F)      --> acclex(freq,F).
sem_haveterm(H)      --> acclex(vhave,H).
integerterm(I)       --> acclex(integer,I).
sem_measureterm(M)   --> acclex(unit,M).
sem_medterm(M)       --> acclex(med,M).
sem_negterm(N)       --> acclex(neg,N).
prepterm(P,C)        --> acclex(p,[P,C]).
sem_timeunitterm(T)  --> acclex(timeunit,T).
```

```
% lexog - adapted from MedLEE lexicon
%%%%%%%%%%%%%%%%%%%%  CLOSED WORD CATEGORY LEXICON %%%%%%%%%%%%%%%%%%%%%%%%%
%%%%%%%%%%%%%%%%%%%%%    NEGATIONS    %%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%
:-unknown(_,fail).
:-multifile(wdef/3).
wdef(cannot,neg,no).
wdef(neither,neg,no).
wdef(never,neg,no).
wdef(no,neg,no).
wdef(non,neg,no).
wdef(none,neg,no).
wdef(not,neg,no).
wdef(nothing,neg,no).
%%%%%%%%%%%%%%%%%%%%    CONJUNCTIONS %%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%
wdef('&',conj,and).
wdef('/',conj,or).
wdef('-',grammar,'-').
wdef('+',conj,and).
wdef(although,conj,and).
wdef(and,conj,and).
wdef(as,conj,and).
wdef(because,conj,and).
wdef(but,conj,and).
wdef(',',conj,',').
wdef(except,conj,no).
%wdef(if,grammar,if).
wdef(minus,conj,no).
wdef(nor,conj,no).
wdef(or,conj,or).
wdef(that,grammar,that).
wdef(though,conj,and).
wdef(thru,conj,and).
wdef(verses,conj,or).
wdef(versus,conj,or).
wdef(vs,conj,or).
wdef(when,grammar,when).
wdef(where,grammar,where).
wdef(whereas,conj,and).
wdef(which,grammar,which).
wdef(while,conj,and).
wdef(who,grammar,who).
wdef(yet,conj,and).
%%%%%%%%%%%%%%%%%%%%%  PREPOSITIONS %%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%
wdef(above,ploc,above).
wdef(about,p,[approximately,nconn]).
wdef(about,ploc,about).
wdef(across,ploc,across).
wdef(abutting,ploc,near).
wdef(accompanies,p,[with,conn]).
wdef(accompanying,p,[with,conn]).
wdef(adjacent,ploc,adjacent).
wdef(adjacent,region,adjacent).
wdef(after,p,[after,conn]).
wdef(after,tprep,after).
wdef(along,p,[on,nconn]).
wdef(approximately,p,[approximately,nconn]).
wdef(around,p,[approximately,nconn]).
```

```
wdef(at,p,[at,nconn]).
wdef(atop,p,[on,nconn]).
wdef(before,ploc,before).
wdef(before,tprep,before).
wdef(behind,ploc,behind).
wdef(below,ploc,below).
wdef(between,ploc,between).
wdef(beyond,ploc,beyond).
wdef(by,ploc,near).
wdef(despite,p,[with,conn]).
wdef(during,p,[during,conn]).
wdef(during,tprep,during).
wdef(encasing,ploc,encasing).
wdef(extending,p,[in,nconn]).
wdef(following,p,[after,conn]).
wdef(following,tprep,after).
wdef(for,p,[for,nconn]).
wdef(from,p,[from,conn]).
wdef(in,p,[in,nconn]).
wdef(including,p,[with,conn]).
wdef(into,p,[in,nconn]).
wdef(involving,p,[of,nconn]).
wdef(next,tprep,next).
wdef(occupying,p,[in,nconn]).
wdef(on,p,[on,nconn]).
wdef(of,p,[of,nconn]).
wdef(over,ploc,over).
wdef(overlie,ploc,over).
wdef(overlied,ploc,over).
wdef(overlies,ploc,over).
wdef(overlying,ploc,over).
wdef(prior,tprep,before).
wdef(near,ploc,near).
wdef(radiating,ploc,radiating).
wdef(regarding,p,[about,nconn]).
wdef(roughly,grammar,roughly).      % 'roughly 6 mm'
wdef(since,p,[since,conn]).
wdef(since,status,subsequent).
wdef(through,p,[in,nconn]).
wdef(throughout,p,[in,nconn]).
wdef(to,p,[to,nconn]).
wdef(toward,p,[to,nconn]).
wdef(towards,p,[during,conn]).
wdef(under,ploc,below).
wdef(underneath,ploc,below).
wdef(until,tprep,until).
wdef(up,grammar,up).
wdef(upon,p,[on,nconn]).
wdef(via,p,[with,conn]).
wdef(with,p,[with,conn]).
wdef(within,p,[in,conn]).
wdef(without,p,[no,conn]).
%wdef(without,neg,no).

%%%%%%%%%%%%%%%%%%%%%%%%%% UNITS OF MEASURE %%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%
wdef('%',unit,percent).
```

```
wdef(cc,unit,cc).
wdef(centimeter,unit,cm).
wdef(centimeters,unit,cm).
wdef(cm,unit,cm).
wdef(degrees,unit,degree).
wdef(gm,unit,gram).
wdef(gms,unit,gram).
wdef(gram,unit,gram).
wdef(grams,unit,gram).
wdef(kg,unit,kilogram).
wdef(kilo,unit,kilogram).
wdef(kilogram,unit,kilogram).
wdef(kilograms,unit,kilograms).
wdef(liter,unit,liter).
wdef(liters,unit,liter).
wdef(microgram,unit,microgram).
wdef(micrograms,unit,microgram).
wdef(milliliter,unit,ml).
wdef(milliliters,unit,ml).
wdef(milligram,unit,mg).
wdef(milligrams,unit,mg).
wdef(milliseconds,unit,millisecond).
wdef(millivolts,unit,millivolt).
wdef(ml,unit,ml).
wdef(millimeter,unit,mm).
wdef(millimeters,unit,mm).
wdef(mm,unit,mm).
wdef(ozs,unit,ounce).
wdef(percent,unit,percent).
%%%%%%%%%%%%%%%%%%%%%%%%% NUMBERS %%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%
wdef(half,integer,'one half').
wdef(semi,quantity,semi).
wdef(ii,integer,2).
wdef(iii,integer,3).
wdef(vi,integer,4).
wdef(v,integer,5).
wdef(vi,integer,6).
wdef(vii,integer,7).
wdef(viii,integer,8).
wdef(ix,integer,9).
wdef(xii,integer,12).
wdef(xiii,integer,13).
wdef(one,integer,1).
wdef(two,integer,2).
wdef(double,quantity,double).
wdef(three,integer,3).
wdef(four,integer,4).
wdef(quadruple,quantity,quadruple).
wdef(five,integer,5).
wdef(six,integer,6).
wdef(sixty,integer,60).
wdef(seven,integer,7).
wdef(eight,integer,8).
wdef(nine,integer,9).
wdef(ten,integer,10).
wdef(eleven,integer,11).
wdef(twelve,integer,12).
```

```
wdef(thirteen,integer,13).
wdef(fourteen,integer,14).
wdef(fifteen,integer,15).
wdef(sixteen,integer,16).
wdef(seventeen,integer,17).
wdef(eighteen,integer,18).
wdef(nineteen,integer,19).
wdef(twenty,integer,20).
wdef(thirty,integer,30).
wdef(forty,integer,40).
wdef(fifty,integer,50).
wdef(sixty,integer,60).
wdef(seventy,integer,70).
wdef(eighty,integer,80).
wdef(ninety,integer,90).
wdef(hundred,integer,100).
wdef(thousand,integer,1000).
wdef(million,integer,1000000).
wdef(billion,integer,billion).
wdef(zero,integer,0).
wdef(first,ointeger,1).
wdef(second,ointeger,2).
wdef(third,ointeger,3).
wdef(fourth,ointeger,4).
wdef(fifth,ointeger,5).
wdef(sixth,ointeger,6).
wdef(seventh,ointeger,7).
wdef(eighth,ointeger,8).
wdef(ninth,ointeger,9).
wdef(tenth,ointeger,10).
wdef(eleventh,ointeger,11).
wdef(twelvth,ointeger,12).
wdef(thirteenth,ointeger,13).
wdef(fourteenth,ointeger,14).
wdef(fifteenth,ointeger,15).
wdef(sixteenth,ointeger,16).
wdef(seventeenth,ointeger,17).
wdef(eighteenth,ointeger,18).
wdef(ninteenth,ointeger,19).
wdef(triple,quantity,triple).
wdef(twentieth,ointeger,20).
wdef(thirtieth,ointeger,30).
wdef(single,quantity,1).
wdef(solitary,quantity,1).

wdef(frequency,grammar,frequency).*/
wdef('.',grammar,'.').
wdef(';',grammar,';').
wdef('/',grammar,'/').
wdef(':',grammar,':').
wdef('?',certainty,'moderate certainty').
wdef('+',certainty,'high certainty').
wdef('''',grammar,'''').

%%%%%%%%%%%%%%%%%%%%%%%%% FREQUENCIES %%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%
wdef(once,freq,1).
wdef(times,grammar,x).
```

```
wdef(twice,freq,2).
```

```
% lexicon with lex0g containing common English words adapted from lex0 of
MedLEE%
% lex1g from lex1 of MedLEE
% August 23, 1999
%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%
%                       CAROL FRIEDMAN                                        %
%          QUEENS COLLEGE, COLUMBIA UNIVERSITY                                %
%
%                       Version 3.0  4-01-00                                  %
%                       Version 2.0  1-31-96                                  %
%                       Version 1.0  1-5-92                                   %
%                                                                             %
%                                                                             %
%                       SEMANTIC LEXICON FOR CLINICAL TEXT                    %
%                                                                             %
%  The lexicon consists of several files:                                     %
%     lex0g.pl: single word closed classes                                     %
%     lex1g.pl: single word - general modifier type words:                     %
                                %
%     wdef(category,target).                                                  %
%          word - is the name of the word being categorized;                  %
%          category - is the semantic category for the word                   %
%          target - is the canonical/standard form for the word               %
%                   words which are synonyms should be assigned the same      %
%                   canonical form.                                           %
%     multi-word phrases are categorized as follows:                          %
%      phrase(word,category,phrase,target).                                   %
%                                                                            %
%    Semantic Categories:                                                     %
%                                                                             %
%       certainty "possible"                                                  %
%               canonical values limited to: moderate -  for possible         %
%                                            high - for high possible         %
%                                            low - for low possible           %

%       conj - relational operators "and", "or" , which connect one finding %
%               to another finding                                            %
%       neg - negation "no", "not"
%       quant - for quantitative information "many"                           %

:-unknown(_,fail).
:-ensure_loaded([nsphrase,lex0g,lex1g,lexsemact,lexsyn,lexsub]).
```

```
% definitions kept from MedLEE lexicon - lex1.pl
wdef(be,vbe,'high certainty').
wdef(been,vbe,'high certainty').
wdef(being,vbe,'high certainty').
wdef(was,vbe,'high certainty').
wdef(is,vbe,'high certainty').
wdef(were,vbe,'high certainty').
/*
wdef(became,vcertainty,'high certainty').
wdef(become,vcertainty,'high certainty').
wdef(becomes,vcertainty,'high certainty').
wdef(becoming,vcertainty,'high certainty').
                          put in action lexicon
wdef(changed,change,change).
wdef(changes,change ,change).
wdef(changing,change,change).
wdef(necessarily,certainty,'high certainty').
wdef(necessary,vrecommend,recommended).
wdef(necessitate,vstatus,need).
wdef(necessitated,vstatus,need).
wdef(necessitating,vstatus,need).
wdef(necessitates,vstatus,need).
wdef(need,vstatus,need).
wdef(needed,vstatus,need).
wdef(needing,vstatus,need).
wdef(needs,vstatus,need).
                                                    */
```

```
% file ml_parser.pl
:- multifile(phrase/5).
:- multifile(wdef/3).
:-unknown(_,fail).
% Load in program components - library components are part of Prolog
:- ensure_loaded([library(basics),library(not),library(lists),
   library(readin),library(strings),library(ctypes),library(readconst),
   library(date), library(listparts), library(sets),
   radrec,radpardb,useful,util,tagging,lexicon, gengram]).

%:- initialization run.
%run :- on_exception(Error,processrun,stop(Error)).
runtime_entry(start) :- processrun.
runtime_entry(abort) :- halt.

% process report
processrun :- process, halt.

%stop(Error) :-
%   told,
%   write(user_error,'Error: '), write(user_error,Error), halt.

% get user supplied parameters and process report
process :-
get_args(Mode,Infile,Outfile,Prb,Undefs,Protocol), !,
           (Examtype = []; % must have a domain
            process(Infile,Outfile,Prb,Undefs)).

% open Infile (text input) and process
process(Infile,Outfile,Prb,Undefs) :-
           see(Infile), seen, see(Infile),
           on_exception(Error,
           test_genome(Outfile,Prb,Undefs),
               app_err0(_,Outfile,Error)),
           closefiles(Outfile,Prb,Undefs).
process(_,Outfile,_,_) :-
        app_err(_,Outfile,'Program failed').

app_err0(_,Output,Error) :-
       tell(Output),
       write('<error>'),
       write('Prolog Error occurred: '),
       app_err(_,Output,Error).
app_err1(_,Output,Error) :-
       tell(Output),
       write('<error>'),
       write('Error in input: '),
       app_err(_,Output,Error).
app_err(_,Output,Error) :-
       tell(Output),
       write(Error), write('</error>'), nl.

closefiles(Outfile,Errfile,Unfile) :-
      tell(Outfile), told,
      (Errfile = []; tell(Errfile), told),
      (Unfile = []; tell(Unfile), told).
```

```
% Argument options - get user defined arguments
% -p ProbFile (otherwise default is problem messages are not written to file)
% -i Infile (if input is supplied by file and not standard input
% -s Section  (default is impression)
% -m Mode (default is relax; the three choices are strict, relax, skip)
% -o Outfile (if output should be file and not standard output)
% -? Provide list of default arguments
% -u Undefs (otherwise default is - undefined messages are not written
%     to a file)
get_args(Mode,Infile,Outfile,Prbfile,Undefs,Protocol) :-
    unix(args(Args)),
  (Args = [], !, writesyntax;
   Args = ['?'],!,  writesyntax;
   Args = [X|Rest], !,
   set_args([X|Rest],Mode,Infile,Outfile,Prbfile,Undefs,Protocol)).

writesyntax :-
     write(user_error,'geneparser [-m Mode]'),
     nl(user_error),
     write(user_error,'          [-t Outtype] [-p Probfile] [-u Undefs]'),
     nl(user_error),
     write(user_error,'          [-i Infile] [-o Outfile]'),
     nl(user_error).
```

```
% nsphrase.pl - contains words/phrases that are ignored
nosem(both, [both]).
nosem(however, [however]).
nosem(selectively, [selectively]).
nosem(specifically, [specifically]).
nosem(the, [the]).
nosem(a, [a]).
```

```
% file radpardb.pl
% June 25, 1999
%  fail an unknown predicate
 :-unknown(_,fail).
:- op(900,  fy, [not,once]).   %  same priority and type as \+
:- op(700, xfx, [\=,~=]).      %  same priority and type as = or ==
:- dynamic(sentno/1).
% \sem\radpardb.pl
%parse_sentences(+Beg,-Fmt,-ParseErrors,-Undefineds,-Unsents,+Section,
%                +UserMode,+Examtype,Sentno,Outsno,IncSno)
%       Beg is list of sentences, Fmt is list of target forms,
%       ParseErrors are a list of sentences which could not parse,
%       Undefineds is a list of undefined words in sentence
%       Unsents is a list of sentence containing undefined words
%       Section is the section of the examination, UserMode is the
%       parsing mode specified by user,
%       Examtype is the domain (type of exam)
%       Sentno is the number of the starting sentence
%       Outsno is the last sentence number + 1
%       IncSno is the amount that the sentence number should be increased
%            (i.e. it is 1 when called by parse_sects and 0 when in
%              recovery mode)
%    Each sentence is parsed independently.
parse_sentences([],[],[],[],[],_,_,_,_,_,_) :- !.  %no more sentences
parse_sentences(Beg,Fmtlist,Outfail,Outundefs,OutunSents,
                Section,UserMode,Examtype,_,_,IncSno) :-
    get_sentence(Beg,S,Rest),  !,
    ( isidentifier(S), !,   % ignore identifier sentences - parse remainder
      parse_sentences(Rest,Fmt1,Outfail,Outundefs,OutunSents,
                Section,UserMode,Examtype,_,_,IncSno), !,
       (outputform(htext), S \= ['.'], !, IncSno \= 0,  %0 means in recovery
mode
        append([[[sentence,S]]],Fmt1,Fmtlist);
        Fmtlist = Fmt1
       )
       ;
      %( IncSno = 0, !;     % on same sentence in recovery mode
      %  sentno(Sno), NewSentno is Sno + IncSno,
      %  retract(sentno(_)), assert(sentno(NewSentno))
      %%),

    % Incsno = 1, write('***'), write_list(S,3,_), nl, !,
     % Incsno = 0,

      preprocess(S,Bs,Undef,Semlist,strict),  % bracket and check for undefineds

      parse_modes(S,Bs,Semlist,Fmt1,Errors,Undef,Unsents,Section,Writefail,
                  Examtype,UserMode,IncSno), % parse first sentence

      parse_sentences(Rest,Fmt2,Moreerrors,Moreundefs,MoreUnSents,
                  Section,UserMode,Examtype,_,_,IncSno),  % parse remaining
      append(Errors,Moreerrors,Outfail),       % Combine failures
      (outputform(htext),
            (Fmt1 \= [], IncSno \= 0,
             !, append([Fmt1],Fmt2,Fmtlist);  % add extra bracket for 1st
             Fmt2 = [],  Fmtlist = Fmt1 , !
             )
```

```
        ;
        append(Fmt1,Fmt2,Fmtlist)
       ),              % Combine targets
       append(Unsents,MoreUnSents,OutunSents), % Combine sentences
       append(Undef,Moreundefs,Outundefs)      % Combine undefined words
      ).

%parse_modes(+S,+Bs,+Semlist,-Fmt,-Failures,+Undef,-Unsents,+Section,
%     +WriteMessage,+Examtype,+Mode,+IncSno)
%        S is original sentence; Bs is sentence after lexical lookup
%        Semlist is list of semantic categories in sentence
%        Fmt is formatted output,
%        Failures is list of sentences/fragments which could not be parsed.
%        Undef are words not in lexicon, Unsents are sentences containing
%                undefined words
%        Section is name of section being processed
%        WriteMessage is message returned from doresult (in case doresult fails)
%        Examtype is domain, Mode is user specified mode
%        IncSno is 0 if this is a fragment of a sentence that was already
%                parsed - but unsuccessfully; is 1 if this is a new sentence
% Best possible - try to get the most accurate parse possible trying
% all alternative strategies in turn if neccessary
% All words in sentence are defined
parse_modes(S,Bs,Semlist,Fmt,Errors,[],[],Section,no,Examtype,Pmode,
              Inc) :-
       (Pmode = bpseg, Pmodemod =  mode2, !; %in recovery mode
        Pmode = bpseg2, Pmodemod = mode2, !;
        Pmode = bpseg3, Pmodemod = mode2, !;
        Pmode = bpskip, Pmodemod = mode4, !; %in recovery mode
         % in user specified parse mode - don't parse in mode 5 or keyword
        Pmode \= keyword, Pmode \= mode5,
        Pmodemod = mode1
        ),
       dosent(S,Bs,Semlist,Fmt1,Message,Section,_,Examtype,Pmodemod,_),!, %
strict first
       recovery(_,S,Bs,Semlist,Fmt2,Message,Errors,[],[],Section,
                 Pmode,Examtype,_), % try alternative modes if neccy
       (outputform(htext), Inc \= 0, !, append([[[sentence,S]],Fmt1,Fmt2],Fmt);
        append(Fmt1,Fmt2,Fmt)
       ).
% alternative strategies if have undefined words
parse_modes(S,Bs,Semlist,Fmt,Errors,Undef,Unsents,Section,no,Examtype,
             Pmode,Inc) :-
      Undef \= [],
      recovery(_,S,Bs,Semlist,Fmt1,yes,Errors,Undef,Unsents,Section,
                Pmode,Examtype,_), % try alternatives if have undefineds
      (outputform(htext), Inc\= 0, !, append([[sentence,S]],Fmt1,Fmt);
       Fmt = Fmt1
      ).
% key word strategy is fastest but least reliable;
parse_modes(S,Bs,Semlist,Fmt,Errors,Undef,Unsents,Section,no,Examtype,
             Pmode,Inc) :-
     (Pmode = keyword; Pmode = mode5
      ; Pmode = mode5),
      recovery(5,S,S,Semlist,Fmt1,yes,Errors,Undef,Unsents,Section,Pmode,
                Examtype,_),
      (outputform(htext), Inc \= 0, !, append([[sentence,S]],Fmt1,Fmt);
```

```
      Fmt1 = Fmt
     ).
% Parsing/Recovery modes
% parse_modes(+Level,+S,+Bs,+Sem,-Fmt,+Failed,+Undef,+Unsents,+Section,
%             +Pmode,+Examtype,_)
%   Level is the recovery level of the predicate
%   S is the original sentence list
%   Bs is the
%   Sem is the list of semantic categories in the sentence
%   Fmt is the formatted output for the sentence
%   Failed is 'yes' if the parse was unsuccessful, and 'no' otherwise
%   Undef is a list of words in sentence which are undefined(not in lexicon)
%   Unsents are the lists of sentences/segments which could not be parsed.
%   Section is the section of the report
%   Pmode is the user specified parse mode
%   Examtype is the domain
% mode 1 is the strictest parsing mode - the parser succeeded for the complete
%        original sentence using the grammar; all words in original sentence
%        are defined in lexicon
% mode 1 - alternative not needed because parse succeeded
recovery(1,_,_,_,[],no,[],Undef,Unsents,_,_,_,_) :- !.
%        - no alternative strategy allowed in mode 1
%          in case where there are no undefineds, Noparse is S
recovery(1,S,_,_,[],yes,S,[],[],_,Pmode,_,_) :-
         Pmode = strict; Pmode = mode1, !.
%          in case there are undefineds, Unsents is S
recovery(1,S,_,_,[],yes,Noparse,Undef,Unsents,_,Pmode,_,_) :-
        (Pmode = strict; Pmode = 'mode1'),
        Undef \= [], Unsents = S, Noparse = [], !.
recovery(1,S,_,Semlist,[],yes,S,_,_,_,_,_,_) :-
% sentence contains no relev. information, don't try to recover
%     \+ (subtype(finding,Semlist); subtype(time,Semlist)), !.
\+ actionchk(Semlist).      % april 23, restored
% mode 4 - skip undefined words and try to parse according to mode 1
recovery(4,S,_,_,Fmt,yes,Errors,Undef,[],Sect,Pmode,Examtype,_) :-
         Undef \= [],
         (Pmode = bp; Pmode = mode4;
          Pmode = bpseg; Pmode = bpskip; Pmode = mode4
         ),
         preprocess(S,Bs,_,Semlist,bpskip),
         dosent(S,Bs,Semlist,Fmt1,Message,Sect,_,Examtype,mode4,_),!,
         recovery(_,Bs,Bs,Semlist,Fmt2,Message,Errors,[],[],Sect,
                  bpskip,Examtype,Sentno), % try alternatives if neccy
           append(Fmt1,Fmt2,Fmt).

% mode 3 - try longest parsed segment; partition rest of
%          sentence using mode 5 for parse mode bp
recovery(3,S,Bs,_,Fmt,yes,Errors,Undef,Unsents,Sect,Pmode,Examtype,_) :-
         % allowable modes for choosing longest segment
         (Pmode = bp; Pmode = bpskip;
          Pmode = skip; Pmode = mode3; Pmode = mode4;
          Pmode = bpseg3; Pmode = bpseg
         ),
         (Pmode = bpskip, Pmodemod = mode4_3;
          Pmodemod = mode3
         ),
         checkst(sem_pattern,_,s,Target,Bs,Rest),  %check symbol table
```

```
        %dooresult(Target,Fmt1,Examtype,Sect,Pmodemod,_),
         formatresult(Target,Pmodemod,Fmt1),
        (Pmode = mode3, Fmtlist = [], Errors = Rest;
        recovery(5,Rest,Rest,_,Fmtlist,yes,Errors,Undef,Unsents,Sect,
                        Pmode,Examtype,_)
        ),
        append(Fmt1,Fmtlist,Fmt).
% mode 2 segments sentence using word barrier methods. This mode is tried if
%          parse failed for original sentence/or there are undefined words
%            segment sentence using word barriers
recovery(2,S,_,_,Fmt,yes,Errors,Undef,Unsents,Sect,Pmode,Examtype,_) :-
        (Pmode = bp; Pmode = bpskip; Pmode = mode2; Pmode = skip;
         Pmode = mode2; Pmode = mode3; Pmode = mode4;
         Pmode = bpseg; Pmode = bpseg2;
         Pmode = bpseg3
         ),
        segmentandparse(S,Fmt,Errors,Unsents,Sect,Pmode,Examtype,_),!.
% mode 5 - try to partition sentences by findings
% when a finding in sentence is found, go left until first
%   modifier is found (if 2 findings are next to each other, 2nd one
%   is considered the finding and 1st is considered the modifier)
%   Repeat searching for successive findings using this method
recovery(5,[],[],_,[],_,[],_,_,_,_,_,_) :- !.
recovery(5,S,Bs,_,Fmt,yes,Errors,Undef,Unsents,Sect,
             Pmode,Examtype,_) :-
        (Pmode = bp; Pmode = bpskip; Pmode = bpseg; Pmode = keymode;
         Pmode = mode5; Pmode = negmode
        ),
         preprocess(S,Bs1,_,_,bpskip),  % skip undefined words
         actionfindingseg(Bs1,Fseg,Before),!,  % get segment containing finding
         (Fseg = [], Errors = S,  !; % no finding to segment
          %Before = [], Errors = Bs, Fmt1 = [], !;  % this part was tried
          preprocess(Fseg,Bseg,_,Semlist,bpskip),
          dosent(Fseg,Bseg,Semlist,Fmt1,Message,Sect,_,Examtype,
                  mode5,_)  % try to parse finding segment
          ),
          (Before = [], Before1 = [], Message = yes, !;  % no segmenting yet -
skip beg.
           Message = yes, Before1 = Before, !;  %don't add '.'; have to skip
more
           append(Before,['.'],Before1)
          ),
          ( Fseg = [], Fmt = [], !;  % no finding left in sent. - don't recover
          recoverrest(Fseg,_,Before1,Fmt2,Message,Errors,
                    Sect,Newmode,Examtype,_),
           % recover remainder
           append(Fmt1,Fmt2,Fmt)
          ).

% nothing could be recovered; all input -> Errors ; Format is []
recovery(_,Sents,_,_,[],yes,Sents,Undef,[],_,_,_,_).

%  part of phrase was skipped,  add period and treated skipped part as a
%  sentence
% recoverrest(+Segment,+Semlist,+Before,-Fmt,+Message,-Failures,+Section,
%        +Mode,+Examtype,_)
%        Segment is part of sentence with a finding
```

```
%       Semlist is a list of semantic categories for that sentence part
%       Before is the part of sentence before Segment
%       Fmt is the format for this segment
%       Message is 'no' if there is no segmantic information to be recovered
%               Message is 'yes' otherwise
%       Failures are lists of segment(s) that could not be parsed successfully
%       Section is section being processed, Mode is user specified parsing mode
%       Examtype is domain
recoverrest(_,_,Before,[],no,Before1,_,_,_,_) :-
  (Before = [], Before1 = [], !;    % nothing was skipped
   append(Before,['.'],Before1)
  ), !.
% nothing left to recover; write phrase that was skipped
recoverrest([],_,Before,[],yes,Before1,_,_,_,_) :-
   (Before = [], Before1 = [], !;
   append(Before,['.'],Before1)
   ), !.
% can recover partial parse
recoverrest(Bs,_,Before,Fmt,yes,Errors,Sect,Pmode,Examtype,_) :-
         checkst(sem_pattern,_,s,Target,Bs,Restseg), % recover from symbol tab.
         %doresult(Target,Fmt1,Examtype,Sect,mode5,_),
          formatresult(Target,mode5,Fmt1),
         recovery(5,Restseg,Rest,_,Fmt2,yes,Error2,
                  [],[],Sect,Pmode,Examtype,_),
         append(Fmt1,Fmt2,Fmt),
         (Before = [], Errors = Error2, !;   %nothing skipped to add '.' to
          append(Before,['.'|Error2],Errors)
         ).
% cannot recover partial parse - skip first element and retry
% if 1st element is a negation semantic type, skip 2nd element instead
%     Handles case where 1st element is a negation,certainty or status
%       add 2nd element to unparsed sentences list (enlcosed in angle brackets).
recoverrest([X,Y|Restseg],_,Before1,Fmt,yes,Errors,
                    Sect,Pmode,Examtype,_) :-
         foundword(X,Sem1,Tar),
         ( member(Sem1,[neg,certainty,vcertainty,vconn,status,vstatus]);
           Sem1 = p, Tar = [_,conn]
         ),
          %(Mod = neg; Mod = certainty; Mod = status; Mod = vcertainty), % leave
this mod in
          preprocess([X|Restseg],Fseg0,_,_,bpskip), % skip undefined words
          findingseg(Fseg0,Fseg,Before2), !,  % get finding seg
          (Fseg = [], Errors = [X,Y|Restseg], Fmt = []; % no finding
           preprocess(Fseg,Bseg,_,Restsem,bpskip), % skip undefined words
           dosent(Fseg,Bseg,Restsem,Fmt1,Message,Sect,_,Examtype,
                  mode5,_),  % try to parse finding segment
           recoverrest(Fseg,_,[Y|Before2],Fmt2,Message,Error2,
                    Sect,negmode,Examtype,_), % recover remainder
           (Before1 = [], Errors = Error2, !;
            append(Before1,[.|Error2],Errors)
           ),
           append(Fmt1,Fmt2,Fmt)
          ).
%   skip 1st element; enclose it in brackets
recoverrest([X|Restseg],_,Before1,Fmt,yes,Errors,
              Sect,Pmode,Examtype,_) :-
          preprocess(Restseg,Fseg0,_,_,bpskip),
```

```
            findingseg(Fseg0,Fseg,Before2), !,  % get finding seg
            append(Before1,[X|Before2],Before),
            (Fseg = [], Errors = [X|Restseg], Fmt = []; % no finding
             preprocess(Fseg,Bseg,_,Restsem,bpskip),
            dosent(Fseg,Bseg,Restsem,Fmt1,Message,Sect,_,Examtype,
                     mode5,_),  % try to parse finding segment
            recoverrest(Fseg,_,Before,Fmt2,Message,Errors,
                       Sect,Newmode,Examtype,_), % recover remainder
            append(Fmt1,Fmt2,Fmt)
            ).

%  no semantic information left; return Errors
recoverrest([X|Restseg],[],Before1,Fmt,yes,[X|Restseg],
                  Sect,Pmode,Examtype,_).

%dosent(+S,+Bs,+Semlist,-Fmtlist,+Message,+Section,+WriteMessage,+Examtype,
%       +Mode)
%       S is original list of words in sentence; Bs is list after lexical lookup
%       Semlist is list of semantic categories corresponding to Bs
%       Fmtlist is list of target forms for sentence
%       Message is 'yes' if the output from parser signals a failure,
%                  and 'no' otherwise
%       Section is section of examination being processed
%       WriteMessage signals whether an error occurred in generating target form
%       Examtype is the domain, and Mode is the user specified mode of parsing
% Parse sentence and returns target in nested format
% Handles case where sentence should be skipped because info is about
%   family member or peripheral to patient
dosent(S,_,Semlist,[],Error,_,_,_,_,_) :-
  skipsentence(S,Semlist,Error), !.
dosent(S,Bs,Semlist,Fmtlist,Errormsg,Section,Writefail,Examtype,Mode,_) :-
   attemptparse(P,Bs,sentence,Semlist,Section,Atotal),
   (  P = [failure], Errormsg = yes, Writefail = no, ! % parse failure
     ;
      P = [], Errormsg = no, Writefail = no, Fmtlist = [], ! % empty target
     ;
      %doresult(P,Fmtlist,Examtype,Section,Mode,_),
        formatresult(P,Mode,Fmtlist),
        Errormsg = no, Writefail = no,!
     ;
      Errormsg = yes, Writefail = yes, !
   ).

%parse_sentences(Beg,Beg,[],[],_,_,_) :-  !.

% attemptparse(-P,+Bs,+Structure,+Semlist,-Ftype,-Total)
%       P is output from parser
%       Bs is list of words in sentence after lexical lookup
%       Structure is name of structure to be parsed
%       Semlist is list of semantic categories corresponding to elements in Bs
%       Total is number of times parser reached sem_sent in grammar;
%                where sem_sent is highest level predicate in grammar
% don't parse if sentence consists of only '.' or ';'
attemptparse([],Bs,_,_,_,_) :-
   Bs = ['.']; Bs = [';'].

% if a template exists for whole sentence, get parse from it
```

```
attemptparse(P,Bs,sentence,_,_,_) :-
   Bs = [X,'.'], is_list(X),  % the whole sentence is a finding
   find_sem_sent(P,X), !.

% parses and retracts wellformed string table - parses sentence
attemptparse(P,Bs,sentence,Semlist,Ftype,Atotal) :-
   retractall(wfst(_,_,_,_,_,_)),
   retractall(addstotal(_)),
   sem_sent(P,Semlist,Atotal,Bs,[]), !.

% parses and retracts wellformed string table - parses bodypart only
attemptparse(P,Bs,bodypart,_,_,_) :-
   sem_bodyloc(P,Bs,[]),
   retractall(wfst(_,_,_,_,_,_)), !.

%segmentandparse(+Sentences,-Fmtlist,-Failures,-Unsent,+Section,+Mode,
%       +Examtype,+Sentno)
%       Sentences is list of sentence segments.
%       Fmtlist consists of the formatted output for the segments
%       Failures is the list of unparsed segments.
%       Unsent is the list of segments with undefined words.
%       Section is the section being processed, Mode is the user specified mode
%       Examtype is the domain and Sentno is the sentence id.
segmentandparse([],[],[],[],_,_,_,_) :- !.
segmentandparse(Sentences,Fmtlist,Failures,UnSent,Section,Mode,
                  Examtype,Sentno) :-
     get_sentence(Sentences,S,Rest), !,  %sentence to segment
     preprocess(S,S1,_,Semlist,Mode), !,
     (Mode = mode2, NewPmode = bpseg2, !;
      Mode = mode3, NewPmode = bpseg3, !;
      NewPmode = bpseg
     ),
     (  segment1(S1,Segs,[],seg), !,
        parse_sentences(Segs,Fmt1,Fails,_,Un1,Section,NewPmode,Examtype,
                        Sentno,Sentno,0), !
      ; segment2(S1,Segs,[],seg), !,
        parse_sentences(Segs,Fmt1,Fails,_,Un1,Section,NewPmode,Examtype,
                        Sentno,Sentno,0), !
      ; segment3(S1,Segs,[],Negstatus,seg), !,
        parse_sentences(Segs,Fmt1,Fails,_,Un1,Section,NewPmode,Examtype,
                        Sentno,Sentno,0), !
     ),
      % fails if cannot segment sentence; otherwise segments remainder
      segmentandparse(Rest,Fmt2,Nexterrors,NextUns,Section,Mode,
                      Examtype,Sentno),
      append(Fmt1,Fmt2,Fmtlist),
      append(Un1,NextUns,UnSent),
      append(Fails,Nexterrors,Failures), !.

%segment1(+S,-Segs,+Beg,+Message)
%       S is list of words in sentence
%       Segs consists of sentence segments as separate sentences
%       Beg is list of words in sentence prior to the current portion of sentenc
%       Message is 'seg' if segmenting succeeded and 'noseg' otherwise
segment1([],[],_,noseg) :- !.
% segment sentence at connect phrase/word or at most conjunctions
% if negation precedes, restore negation
```

```
segment1([X|Rest],['.','<eos>'|Rem],Beg,seg) :-
     \+ sem_endmark(Rest,[]), % don't segment if at end already
     foundword(X,Sem,Target),    % get semantic classification and target
     ( X = nor, append([no],Rest,Rem)  % ok to segment at nor
      ;X = without, append([no],Rest,Rem)    % ok to segment at without
      %;X = ':', Rest = Rem
      ; Sem = neg, Rest = [Next|Rest2], % have negation; test word after
        foundword(Next,Sem2,Target2),    % for connective - add back negation
         testforconn(Next,Sem2,Target2), Rem = [X|Rest2]
      ; testforconn(X,Sem,Target), Rest = Rem
     ).

segment1([X|Rest],[X|Newrest],Start,Seg) :-
       append(Start,[X],Beg),     % part before segmentation
       segment1(Rest,Newrest,Beg,Seg).

testforconn(X,Sem,Target) :-
       ( Sem = p, Target = [P,conn],P\= with  % segment at connective prep
       ; member(Sem,[vconn,vshow])   % segment at these types of verbs
       ; Sem = conj, \+ member(X,[and,or,',',',','/',as])
       ).
% segment at certain words -
segment2([],[],[],noseg) :- !.

segment2(S,Segs,[],seg) :-
        seg2(S,Rest,Segs),
        \+ sem_endmark(Rest,[]), !.
segment2([X|Rest],[X|Newrest],[],Seg) :-
       segment2(Rest,Newrest,[],Seg).
seg2([X|Rest],Rest,['.','<eos>'|Rem]) :-
        member(X,[which,that,until,where,when,while,who,
         '(',')',between,whereby,after,before,prior,
         greater,ranging]),
        Rem = Rest, !.

segment3([],[],_,_,noseg) :- !.
% segment at conjunction - if negation preceded conjunction, add
segment3([X|Rest],Rem,Beg,Negstatus,seg) :-
       \+ sem_endmark(Rest,[]), !,  %  already at end of sentence
        seg3([X|Rest],Rem,Beg,Negstatus,seg), !.

seg3([X|Rest],Rem,Beg,Negstatus,seg) :-
        wdef(X,conj,_),
        member(X,[and,or,',']),
        (nonvar(Negstatus), Rem = ['.',Negstatus|Rest], ! %restore negation
         ; Rem = ['.','<eos>'|Rest], !
        ).
seg3([X|Rest],[X,'.','<eos>'|Rest],_,_,seg) :-
       foundword(X,age), !.

seg3([X|Rest],[X|Newrest],Start,Negstatus,Seg) :-
        ( nonvar(Negstatus), !;  % 1st neg already found  -  continue segmenting
        foundword(X,Sem,Target), !,
            ( Target = no, Negstatus = X, !;
              Sem = neg, Negstatus = X, !;
              Sem \= neg, Target \= no, !
            );
```

```
        true, !     % word is undefined
        ),
       append(Start,[X],Beg),     % part before segmentation
       segment3(Rest,Newrest,Beg,Negstatus,Seg), !.

% for finding type classes - parse as a sentence
whattoparse(Sem,P,Sent) :-

member(Sem,[cfinding,pfinding,morph,disease,device,proc,mproc,descriptor]),
        attemptparse(P,Sent,sentence,[Sem],impression,_).

% for bodyloc classes - parse as a bodyloc modifier
whattoparse(Sem,P,Sent) :-
        member(Sem,[bodyloc,region,side,position]),
        attemptparse(P,Sent,bodypart,_,_,_).
```

```
% file radrec.pl
% September 7, 1999
%  fail an unknown predicate
 :-unknown(_,fail).
:- op(900,  fy,  [\+,not,once]).      %  same priority and type as \+
:- op(700, xfx,  [\=,~=]).      %  same priority and type as = or ==
:- dynamic(domain/1).             %  domain being processed
:- dynamic(outputform/1).         % form of output (needed to distinguish
                                  % markup of text from formatting forms
:- dynamic(currentsect/1).        % section for outputting results

test_genome(Outfile,Errfile,Unfile) :-
     get_inputsents([],Toklist), !, % read in and tokenize input
     (Toklist = [], !,     % error condition
      app_err1(_,Outfile,'No input sent'), !
        ;
      parse_sentences(Toklist,Fmtlist,Failed,Undef,UnSent,impression,
bp,genome,_,_,0),!,
      outputresults(Fmtlist,Failed,Errfile,Undef,Unfile,UnSent,Outfile,
                    full,line,genome,1,0,_,exe,plain)
     ).

outputresults(Fmtlist0,Failed,Errfile,Undef,Unfile,UnSent,Outfile,
              Amount,Type,Exam,Compno,DocComp,NewCompno,Caller,Protocol) :-
      tell(Outfile),
     (Protocol = sgml, !, Op = sgml;
       Caller = server, !, Op = sgml;
        Op = plain),
      (Type = nested, !,  % original output form - nested findings
        write('<nested>'),new_line(Op),
         write(Fmtlist), new_line(Op), write('</nested>'),
         new_line(Op), !
       ),
     (Caller = server,
      write_message(Unfile,Undef,Caller,'<undefined>','</undefined>')
      ;
      Caller = exe, Undef \= [],
      write_message(Unfile,Undef,Caller,'***** Undefined Words *****',[])
      %write_highlight([],UnSent,Caller)
      ;
       true
      ),
     (Caller = server,
     write('<noparse>'),!,
     write_highlight(Undef,UnSent,Caller),
     write_highlight([],Failed,Caller), write('</noparse>')
     ;
     Caller = exe, Errfile \= [], Failed \= [],
     tell(Errfile),
     write('***** Sentences/Phrases Not Parsed *****'), nl,
     %write_highlight(Undef,UnSent,Caller),
     write_highlight([],Failed,Caller)
     ;
     true    % no Errfile to write to
    ).

% set_args: Process options
```

```
% Argument options
% -p ProbFile (otherwise default is problem messages are not written to file)
% -i Infile (if input is supplied by file and not standard input
% -m Mode (default is bp; the 6 choices are bp, model - mode5)
% -o Outfile (if output should be file and not standard output)
% -? Provide list of default arguments
% -pr Protocol - sgml or plain (default is plain)
% -u Undefs (otherwise default is - undefined messages are not written
%     to a file)
set_args(Args,Mode,Infile,Outfile,Prbfile,Undef,Protocol) :-
      set_mode(Args,Mode), set_amount(Args,Amount),
      set_protocol(Args,Protocol),
      set_infile(Args,Infile), set_outfile(Args,Outfile),
      set_prbfile(Args,Prbfile), set_undefs(Args,Undef).

set_mode(Args,Mode) :-
    (nextto('-m',M,Args); nextto(m,M,Args)), !,
    modeis(M,Mode), !.
set_mode(_,bp).   % default output type

modeis(relax,mode2) :- !.
modeis(strict,model) :- !.
modeis(skip,mode4) :- !.
modeis(longest,mode3) :- !.
modeis(best,bp) :- !.
modeis(model,model) :- !.
modeis(mode2,mode2) :- !.
modeis(mode3,mode3) :- !.
modeis(mode4,mode4) :- !.
modeis(mode5,mode5) :- !.

set_protocol(Args,Protocol) :-
    (nextto('-pr',Protocol,Args); nextto('pr',Protocol,Args)),
     member(Protocol,[sgml,plain]), !.
set_protocol(_,plain).
set_undefs(Args,Undefs) :-
    nextto('-u',Undefs,Args); nextto(u,Undefs,Args) , !. % undef file option
set_undefs(_,[]).   % default is no file of undefineds created

set_infile(Args,Infile) :-
    nonvar(Infile), !;  % Infile is set already
    nextto('-i',Infile,Args), !;
    nextto(i,Infile,Args), !.
set_infile(_,user_input).   % default is standard input

set_prbfile(Args,Prbfile) :-
    nextto('-p',Prbfile,Args), !; nextto(p,Prbfile,Args), !. % prob file option
set_prbfile(_,[]).   % default is no file of problems is created

set_outfile(Args,Outfile) :-
    nonvar(Outfile), !;    % Outfile is already set
    nextto('-o',Outfile,Args), !; nextto(o,Outfile,Args), !. % outfile option
set_outfile(_,user_output).   % default is standard output

new_line(sgml) :-  write('<br>'), nl, !.
new_line(server) :- write('<br>'),nl, !.
new_line(exe) :- nl.
```

```
new_line(plain) :- nl. '
write_message(_,[],exe,_,_) :- !.
write_message([],_,exe,_,_) :- !.
write_message(_,[],plain,_,_) :- !.
write_message([],_,plain,_,_) :- !.
write_message(File,Contents,Caller,Begmsg,Endmsg) :-
    ( member(Caller,[exe,plain]), tell(File), !
     ;
     true),
     write(Begmsg), new_line(Caller),
    (Contents = []; write_list(Contents,1), new_line(Caller)
    ),
    (Endmsg = [], !;
     write(Endmsg), !, new_line(Caller)
    ).

sentend([X|_],Caller) :-
   member(X,['.',';','?']), new_line(Caller), !.


gettargets([],[]) :- !.
gettargets([ignore|Rest],[ignore|Rest]) :-!.  % possibly ignore info.
gettargets([W1|Rest],[T1|Trest]) :-
     foundword(W1,_,T1),    % target for W1
     gettargets(Rest,Trest), !.
gettargets(W,W).  % not in lexicon
isneg(X) :-
    intersect(X,[no,negative,deny,'rule out']).

writeoutsent([Word|Rest]) :-
  write(''''), write(Word), write(''''), !,
  (Word = '''', write(''''), !; true),
  (Rest \= [], write(','), !, writeoutsent(Rest), !;
   true), !.
```

```
%  This file contains predicates associated with SGML tags
%  nextTag(+L,Tag,-PreTag,-PostTag) is true if
%     L is the starting List
%     Tag is an SGML tag; it could be a variable or instantiated already
%     PreTag is portion of L preceding Tag
%     PostTag is portion of L following Tag
nextTag(L,Tag,PreTag,PostTag) :-
    append(PreTag,['<',Tag,'>'|PostTag],L).

% endTag(+L,+Tag,-Pre,-Post) is true if
%     L is the starting list
%     Tag is the SGML end tag
%     Pre is the portion of L preceding the end of tag
%     Post is the portion of L following the end of tag
endTag(L,Tag,Pre,Post) :-
    append([Pre,['<','/',Tag,'>'],Post],L).

% enclosedPart(+L,+Tag,-Enclosed) is true if
%     L is the starting List; it is assumed that L is portion of some
%     list that follows a begin tag - i.e. '<',Tag|L
%     Tag is the SGML tag
%     Enclosed is the portion of text enclosed in tag; not including
%     end tag.
enclosedPart(L,Tag,Enclosed,Post) :-
    endTag(L,Tag,Enclosed,Post).
```

```
% file useful.pl - lexical lookup and utility tools
:-unknown(_,fail).
:-dynamic(sentence/1).
:- op(900,  fy, [not,once]).  %  same priority and type as \+
:- op(700, xfx, [\=,==]).     %  same priority and type as = or ==
% useful.pl February 21, 1992
%
% preprocess(+S,+Bs1,-U,-Sem3,+Mode): preprocesses sentence to
%           bracket lexical phrases and remove words/phrases in
%           special db of noise words (nosem in nsphrase.pl db)
%       S is original sentence
%       Bs1 is preprocessed sentence
%       U is list of undefined words in sentence
%       Mode is mode of process - in skip mode undefined words are removed
%         from preprocessed sentence
preprocess(S0,Bs1,U,Sem3,Mode) :-     %cfnew
  checkbeg(S0,S),          % if beginning is 'A)' ignore
  checkphrase(S,S1,Sem1),  % bracket all phrases in phrasal lexicon first
  checklist(S1,U1,Bs,Sem2,Mode), % check that all words are in lexicon, remove
non semantic
  checklist(Bs,U,Bs1,Sem3,Mode). % check for phrases after non-sem are removed
 %append(Sem1,Sem2,Sem1),
 %append(Sem1,Sem3,Semlist),
  %union(U1,U2,U).
% found checks if word X is defined as a single word, or if X starts a defined
% phrase
foundword(X) :-
     wdef(X,_,_), !.
foundword(X) :-
      semw(X,_,_,_),!.
%definition from tagged input
foundword(X) :-
    phr(X,_,_,_), !.
foundword([X|Rest]) :-
       Rest \= [],
     phrasal(X,_,[X|Rest],_), !.
% 3/99 added foundword to search the new semact.pl lexicon
% phrasal using semp was added to util.lp
% found/2 returns semantic cat. of word
foundword(X,Sem) :-
     wdef(X,Sem,_).
foundword(X,Sem) :-
      semw(X,Sem,_,_).
%definition from tagged input
foundword(X,Sem) :-
      phr(X,Sem,[],_).
foundword([X|Rest],Sem) :-
     phrasal(X,Sem,[X|Rest],_).
% found/3 returns semantic cat. and target form
foundword(X,Sem,Form) :-
     wdef(X,Sem,Form).
foundword(X,Sem,Form) :-
      semw(X,Sem,Form,_).
%definition from tagged input
foundword(X,Sem,Form,_) :-
      phr(X,Sem,[],Form).
foundword([X|Rest],Sem,Form) :-
```

```
     phrasal(X,Sem,[X|Rest],Form).

%collectsem(+Word,-Sem): Sem is the list of semantic classes corresponding
%   to Word
collectsem(Word,Sem) :-
    setof(X,foundword(Word,X),Sem).
% missing checks if a word present in a sentence is defined
missing(X) :-
     member(X,S),
     not foundword(X).
% checkbeg(+S0,-S) checks beginning of sentence; if it begins with a letter or
% number followed by a ')', that part is skipped
checkbeg([X,')'|Rest],Rest) :- !.
checkbeg(X,X).

% checks every word in a list to see if it is defined; creates
% a new list of words not defined, and a new list of sentence
% where phrases are bracketed.
checklist([],[],[],[],_).
% if X is a list it has already been identified as a phrase in phrasal lex
checklist([X|Rest],Undef,Newrest,Semlist,Mode) :-
     is_list(X),
     check_no_sem([X|Rest],Rest1,_),
     checklist(Rest1,Undef,Newrest,Semlist,Mode), !.   %is phrase part of nosem
checklist([X|Rest],Undef,[X|Newrest],Semlist,Mode) :-
     %collectsem(X,Sem),
     is_list(X),    X = [W1|Tail],
     phrasal(W1,Sem,X,_),
     checklist(Rest,Undef,Newrest,Sem2,Mode) , !,
     append([Sem],Sem2,Semlist).
checklist([without|Rest],Undef,Newrest,Semlist,Mode) :-
     checklist([with,no|Rest],Undef,Newrest,Semlist,Mode).
% this problem has to be fixed in preprocessor
% check for a number with a ','  - "11,200"  and fix it
%checklist([X,',',Y|Rest],Undef,[N|Newrest],[number|Semlist],Mode) :-
%    number(X), number(Y), N is X * 1000 + Y, !,
%    checklist(Rest,Undef,Newrest,Semlist,Mode), !.
% check for a literal number    %cfnew
checklist([X|Rest],Undef,[X|Newrest],[number|Semlist],Mode) :-
     number(X) ,
     checklist(Rest,Undef,Newrest,Semlist,Mode), !.
% beginning of List is a prefix of a phrase that is a complete finding
checklist(List,Undef,[Phrase|Newrest],[cfinding|Semlist],Mode) :-
     check_sem_finding(List,Rest,Phrase),
     checklist(Rest,Undef,Newrest,Semlist,Mode) , !.
% beginning of List is a prefix of a phrase that is in nosemantic lexicon
checklist(List,Undef,Newrest,Semlist,Mode) :-
     check_no_sem(List,Rest,Phrase),
     checklist(Rest,Undef,Newrest,Semlist,Mode), !.
% beginning of List is a prefix of a phrase that is in phrasal lexicon
checklist(List,Undef,[Phrase|Newrest],Semlist,Mode) :-
     get_longest_sem(List,Rest,Phrase,Sem),
     %check_sem(List,Rest,Phrase,Sem),    %change to get longest phrase
     checklist(Rest,Undef,Newrest,Sem2,Mode), !,
     append(Sem,Sem2,Semlist).
% beginning of List is a single word that is in semantic lexicon
checklist([X|Rest], Undef,[X|Newrest],Semlist,Mode):-
```

```
      collectsem(X,Sem), !,
      %foundword(X,Sem), !,
      checklist(Rest, Undef,Newrest,Sem2,Mode), !,
      append(Sem,Sem2,Semlist).
% beginning of List is an undefined word
checklist([X|Rest],Undefs,Nrest,Semlist,Mode):-
      checklist(Rest,Undef,Newrest,Semlist,Mode),
      (member(X,Undef), !; Undefs = [X|Undef], !),
      (Mode = skip, !, Nrest = Newrest;
       Mode = bpskip, !, Nrest = Newrest;
       Nrest = [X|Newrest]), !.

% if beginning is a number followed by a . followed by a non number
% skip;   %cfnew
checkphrase([X,.],[X,.],[]) :-  !.
checkphrase([X,.,Z|Rest],Y,Semlist) :-
      number(X), not(number(Z)), checkphrase(Rest,Y,Semlist), !.
% beginning of List is a prefix of a phrase that is a complete finding
% or a phrase in phrasal lexicon
checkphrase(List,[Phrase|Newrest],Semlist) :-
      (check_sem_finding(List,Rest,Phrase), Sem = [cfinding];
       get_longest_sem(List,Rest,Phrase,Sem)
      ), !,
      %check_sem(List,Rest,Phrase,Sem)), !,
      checkphrase(Rest,Newrest,Sem2) , !,
      append(Sem,Sem2,Semlist).
checkphrase([W|Rest],[W|Newrest],Semlist) :-
      checkphrase(Rest,Newrest,Semlist).
checkphrase([],[],[]).

check_sem_finding([W|Tail],Tail,W) :-
            W = [W1|Rest],  % W is bracketed already
            sem_finding_sent(W1,W,_).
check_sem_finding([W|Tail],Sfinal,Phrase) :-
            sem_finding_sent(W,Phrase,_),
            begsublist(Phrase,[W|Tail],Sfinal), !.
sem_finding_sent(_,_,_) :- fail.
% check_no_sem(+Sent,-Rest,-Phrase): removes Phrase from Sent resulting
%    in Rest if Sent begins with a phrase in nosem (non-semantic list).
check_no_sem([W|Tail],Sfinal,Phrase) :-
            nosem(W,Phrase), %phrase beg. with W that should be removed
            begsublist(Phrase,[W|Tail],S1),
            remove_comma(S1,Sfinal), !.  % remove "," if it is next
%get_longest_sem(+Sent,-Rest,-Phrase,-Sem): Phrase is longest phrase that is
%  a prefix of Sent; Rest is remainder and Sem is list of semantic classes
get_longest_sem(Sent,Rest,Phrase,[Sem]) :-
        setof(X,check_sem(Sent,X),L),   % set of Phrases
        maxphrase(L,[],Phrase,0),       % Phrase with maximum length
        append(Phrase,Rest,Sent),       % rest of sentence after Phrase
        foundword(Phrase,Sem).

% check_sem(+Sent,-Rest,-Phrase,-Sem): checks if phrase beginning with
%       Sent is in phrasal lexicon; Rest is the remainder of Sent after phrase
%       Sem is the semantic class
check_sem([W|Tail],Rest,Phrase,Sem) :-
            phrasal(W,Sem,Phrase,_),
            begsublist(Phrase,[W|Tail],Rest).
```

```
%       this also obtains the Target form
check_sem([W|Tail],Rest,Phrase,Sem,Target) :-
           phrasal(W,Sem,Phrase,Target),
           begsublist(Phrase,[W|Tail],Rest).
check_sem([W|Tail],Tail,W,Sem) :-
           is_list(W),    %enclosed in brackets means it is a phrase
           W = [W1|Rest],
           phrasal(W1,Sem,W,_), !.
check_sem([W|Tail],Tail,W,Sem,Target) :-
           is_list(W),    %enclosed in brackets means it is a phrase
           W = [W1|Rest],
           phrasal(W1,Sem,W,Target), !.
% check_sem(+Sentence,-Phrase) is similar to check_sem/4 except for fewer args
check_sem(Sentence,Phrase) :-
          check_sem(Sentence,_,Phrase,_).
```

```
% file util.pl
%%%%%%%%%%%%%%%%  Utility Predicates  %%%%%%%%%%

%  fail an unknown predicate
:-unknown(_,fail).
:- op(900,  fy, [not,once]).  %  same priority and type as \+
:- op(700, xfx, [\=,~=]).     %  same priority and type as = or ==

:- dynamic(wfst/6).
:- dynamic(addstotal/1).
:- dynamic(paragno/1).
:- dynamic(sectno/1).
:- dynamic(phr/4).

% wfst(+Rule,+Number,+Res,+Fmt,+S0,+S):  well-formed symbol table
%       Rule is the name of rule; Number is the option number
%       Res is s for success and f for failure
%       Fmt is the format (for successes); for failure Fmt is []
%       S0 is the sentence position at the start of Rule
%       S is the sentence position when Rule has been completed
%        add to wfst

addst(Rule,Number,Res,Fmt,S0,S) :-
    \+ checkst(Rule,Number,Res,Fmt,S0,S),  %result for rule was saved already
    \+ checkst(Rule,Number,i,Fmt,S0,S),    % result from different rule saved
   ( checkst(Rule,_,Res,Fmt,S0,S),   % different rule produced same result
      assert(wfst(Rule,Number,i,Fmt,S0,S));
    assert(wfst(Rule,Number,Res,Fmt,S0,S))), !.
addst(_,_,_,_,_,_):- !.     % always succeed

% checkst(+Rule,-Number,-Res,-Fmt,+S0,-S): checks to see if rule has been saved
%       in wfst
checkst(Rule,Number,Res,Fmt,S0,S) :-
    wfst(Rule,Number,Res,Fmt,S0,S).

% beglist(L,Y) - is Y the head of list L
beglist([X|_],Y) :-   X = Y , !.
% splice(+L1,-L2) : L1 is a list of lists; L2 is  merged list
splice(L1,L2) :- append(L1,L2), !.
%splice([],[]) :- !.
%splice([[]],[]) :- !.
%splice([X],X) :- !.
%splice([[]|L1],L2) :- splice(L1,L2),!.
%splice([[[]]|L1],L2) :- splice(L1,L2),!.
%splice([X|[[]]],L) :- splice(X,L),!.
%splice([L1,L2],L3) :-
%       append(L1,L2,L3), !.
%splice([X|L1],L2) :-
%        splice(L1,L3),
%       append(X,L3,L2) , !.

%splicerel - works with relations which have Arg1,...,Argn.
%            It splices a Splicelist in each arg of relation
splicerel(Finding,Splicelist,Spliced) :-
            splice(Splicelist,Sp1),
            (Finding = [rel,X|Rest], spliceargs(Rest,Sp1,Sp),
              %splice([[rel,X],Sp],Spliced),!;
```

```
            append([rel,X],Sp,Spliced),!;
            %splice([Finding,Sp1],Spliced) ).
            append(Finding,Sp1,Spliced) ).
%spliceargs - Splices a list into each element of a list
spliceargs([],_,[]) :-!.
spliceargs([Arg1|Rest],Splicelist,Spliced) :-
          %splice([Arg1,Splicelist],Sarg1),
          append(Arg1,Splicelist,Sarg1),
          spliceargs(Rest,Splicelist,Srest),
          %splice([[Sarg1],Srest],Spliced).
          append([Sarg1],Srest,Spliced).
list([],[]).
list([X|[]],X).
list([X|L1],L2) :- list(L1,L3),
                   append([X],L3,L2), !.

% strip(L1,L2) removes extra square brackets from L
strip([L],L).

% B is a suffix of A and C is the difference
difflist(A,B,C) :- append(C,B,A).
% S is a sublist at beg. of L if there is a list Rest, which when appended
%   to S results in L.
begsublist(S,L,Rest) :- append(S,Rest,L), !.
% checks that first element in list S has semantic category in Semlist
firstword([W1|_],Semlist) :-
    atom(W1), wdef(W1,Sem,_),  % semantic category
    member(Sem,Semlist).
firstword([W1|_],Semlist) :-
    is_list(W1), phrasal(W1,Sem,_,_),
    member(Sem,Semlist).
% removes phrases from first arg that are in nsphrase - lexicon of non-sem.
phrases
remove_no_sem([],[]) :- !.
remove_no_sem([W|Tail],Sfinal) :-
          nosem(W,Phrase), %phrase beg. with W
          begsublist(Phrase,[W|Tail],S1), %remove from sentence
          remove_comma(S1,S2),   %remove "," if it is next
          remove_no_sem(S2,Sfinal), !.
remove_no_sem([W|Tail],Sfinal) :-
          remove_no_sem(Tail,S1),
          append([W],S1,Sfinal) , !.
remove_comma([','|Tail],Tail).
remove_comma(S,S).
% remove_sem(+Sent,-NewSent): Sent is the original sentence, NewSent is
%    stripped of all phrases that are defined in lexicon
remove_sem([],[]) :- !.
remove_sem(S,NewS) :-
    check_sem(S,Rest,_,_),   % phrase in sent. is in lexicon - remove it
    remove_sem(Rest,NewS), !.
remove_sem(S,NewS) :-
    check_no_sem(S,Rest,_),   % phrase in sent. is in nosem list - remove it
    remove_sem(Rest,NewS), !.
remove_sem([X|Tail],[X|NewS]) :-
    remove_sem(Tail,NewS), !.  % not a phrase, process rest
% remove_words(+Sent,-NewSent): Sent is the original sentence, NewSent
%   is stripped of all words that are in lexicon
```

```
remove_words([],[]) :- !.
remove_words([X|Rest],NewRest) :-
    ( (foundword(X); number(X)),     % X is defined in lexicon
      remove_words(Rest,NewRest) ,!;
      remove_words(Rest,New), NewRest = [X|New], !  % X is not in lexicon
    ).
%maxphrase(+ListofPhrases,+Maxin,-MaxOut,InitMaxLen) is true if
%   ListofPhrase is a list of multi-word phrases,
%     Maxin is phrase with maximum words so far
%     MaxOut is phrase with maximum length of phrases in ListofPhrases
%     InitMaxLen is length of initial phrase which is of max. length
maxphrase([],Maxin,Maxin,_) :- !.  % no more phrases - maximum is same as maxin
maxphrase([P|Rest],Maxin,Maxout,InitMaxLen) :-
     length(P,Len),  % length of first phrase
     ( Len > InitMaxLen, !, maxphrase(Rest,P,Maxout,Len);
       Len < InitMaxLen, !, maxphrase(Rest,Maxin,Maxout,InitMaxLen)
     ).

%%%%%%%%%%%%%%%%%%%%%%%%% lexical interface predicates %%%%%%%%%%%%%%%%%%%%%
%acclex(Sem,W,S0,S) :-
%   outputform(htext), !, acclex1(Sem,W,S0,S).
acclex(Sem,W,S0,S) :-
   acclex2(Sem,W,S0,S).
acclex(Sem,W,S0,S) :-
   acclexss(Sem,Syn,Target,Features,S0,S).
% check lexicon for word or phrase, Target form is original W
acclex1(p,[P,C],[W|Rest],Rest) :-
         is_list(W),
         find_sem_phrase(p,[P,C],W).
acclex1(p,[P,C],[W|S],S) :- atom(W),
                            wdef(W,p,[P,C]).
acclex1(Sem,[W],[W|Rest],Rest) :-
         is_list(W), %if bracketed list, get Sem and Code from phrasal lexicon
         find_sem_phrase(Sem,_,W).

acclex1(Sem,W,[W|S],S):-   atom(W),
                           wdef(W,Sem,_).
% check lexicon for word or phrase, Target form is taken from lexicon
%acclex2(Sem,Code,[W|Rest],Rest) :-
%         is_list(W), %if bracketed list, get Sem and Code from phrasal lexicon
%         find_sem_phrase(Sem,Code,W).

acclex2(Sem,Code,[W|S],S):-   foundword(W,Sem,Code),
                                        nonvar(Code).    % protect against
lex. error
% find a phrase [W|Tail] in lexicon that begins with W and has category Sem
find_sem_phrase(Sem,Code,[W|Tail]) :-
         phrasal(W,Sem,[W|Tail],Code),  % phrase and code beg. with W
         nonvar(Code).
% case where phrase is already bracketed, look up phrase
sem_finding_phrase1(Code,[W|Tail],Tail) :-
         is_list(W), %phrase is bracketed
         find_sem_sent(Code,W),
          nonvar(Code).    %protect against lexical error
% case where phrase is already bracketed, look up phrase
sem_finding_phrase2(Code,[W|Tail],Tail) :-
         is_list(W), %phrase is bracketed
```

```
        find_sem_sent(Code,W),
         nonvar(Code).    %protect against lexical error
% Phrasal succeeds if lexicon contains phrase
phrasal(W1,Sem,Phrase,Code) :-
      phrase(W1,Sem,Phrase,Code,_).   %multi-word phrase in lexicon
% added March15, 1999
phrasal(W1,Sem,Phrase,Code) :-
           semp(W1,Sem,Phrase,Code,Features).
% lexical definition from marked up input
phrasal(W1,Sem,[W1|Tail],Code) :-
           phr(W1,Sem,Tail,Code).
acclexss(Sem,Syn,Target,Features,[W|S],S):-
           atom(W),
           semw(W,Sem,Target,Features),
           synw(W, Synclass),
           member(Synclass,Syn).
acclexss(Sem,Syn,Target,Features,[W|S],S):-
           is_list(W),
           find_phrasess(W,Sem,Syn,Target,Features).
find_phrasess([W1|Tail],Sem,Syn,Target,Features):-
           semp(W1,Sem,[W1|Tail],Target,Features),
           synp(W1,[W1|Tail],Synclass),
           member(Synclass, Syn).

% lexical definition of a complete finding
find_sem_sent(Code,[W|Tail]) :-
        sem_finding_sent(W,[W|Tail],Code).

listify(C,[C]) :-
        atom(C), !.
listify(C,C) :-
         is_list(C), !.

% distributes left mods and right mods over list of findings creating
% list of lists of findings with mods
distributemods([],[],_,_,_) :- !.
distributemods(Dist,[D1|Tail],Lmods,Rmods,Type) :-
       distributemods(Dist2,Tail,Lmods,Rmods,Type), %distributed for remainder
       mergemods(Lmods,Rmods,Allmods),
       frame(D,Type,D1,Allmods),    %Type frame with mods
       append([D],Dist2,Dist).      % Combine findings to get list of findings

% fixconj - if Leftmods has [certainty,no], and Conj = or, change Conj to and.
%       no A or B = no A and no B; 'denies A,B, or C' is similar.
fixconj(Leftmods,Conj,[rel,and]) :-
       (member([certainty,no],Leftmods); member([certainty,deny],Leftmods)),
       Conj = [rel,or].
fixconj(_,Conj,Conj).

%        write_sentences/1 inputs a PROLOG list and prints out lines
%        which which are English sentences. No wrapping is done.
write_sentences([]) :- !.
write_sentences([X]) :- write(X), nl.  % special sentence - section name
write_sentences(['<',p,'/','>']) :-
     write('<p/>'), nl.   % paragraph mark
write_sentences([X|Rest]) :-
        upper_first([X|Rest],[U|Rest]),
```

```
        write(U),  % First letter of first word made upper case
        %write(X),
        (X = U, chkforpunct(U,Rest), !, write_terms(Rest);  % no space needed
        write(' '), write_terms(Rest)
        ).

%        write_sentence/2 inputs a PROLOG list and prints out an English
%        sentence wrapped. Idlen is the starting position of the sentence
%        in the output.
%         uses libraries ctypes, basic, not
write_sentence([X|Rest],Idlen) :-
    upper_first([X|Rest], [U|Rest]),
    write(U),
    name(U,LU),length(LU,L),
    (U = X, chkforpunct(U,Rest), !, write_terms(Rest, L+Idlen);
     write(' '), write_terms(Rest, L+Idlen+1)
    ).

%       write_list inputs a PROLOG list and prints out a sentence like list.
%        wrapped. Idlen is the starting position of the list in the output.
write_list([X|Rest],Idlen) :-
    write(X),
    name(X,LU),length(LU,L),
   ( chkforpunct(X,Rest), write_terms(Rest, L+Idlen), !;
     write(' '), write_terms(Rest, L+Idlen+1)).
%write_list(+List,+Idlen,-Idlenout)
% write_list prints out a sentence like list with wrapping if necessary.
%   List is the list to be printed
%   Idlen is the column position at start
%   Idlenout is the column position at end
write_list([],Len,Len) :- !.
write_list([X|Rest],Idlen,Idlenout) :-
    atomic(X), write(X),
    name(X,LU), length(LU,L),
    (L + Idlen > 74, nl, Idlen2 = 1, !;
     Idlen2 = L + Idlen, !
    ),
  (chkforpunct(X,Rest), write_list(Rest,Idlen2,Idlenout), !;
    write(' '), write_list(Rest,L+Idlen2+1,Idlenout), !
  );
   is_list(X), write_list(X,Idlen,Idlen2), write_list(Rest,Idlen2,Idlenout).

upper_first([X|Rest], [U|Rest]):-
     name(X, [L|Z]),
 (is_alpha(L), Up is L - 32, !; Up = L),
 name(U,[Up|Z]), !.

% write_terms/1 writes out a word followed by blank, except for punctuations.
write_terms([]) :- !.
% case where X is end of sentence
write_terms([X|Rest]) :-
   (X = '.'; X = ';'),  % last word of sentence
   write(X), nl,  !, write_sentences(Rest), !.
% case where X is interior of sentence
write_terms([X|Rest]) :-
     write(X),
     (chkforpunct(X,Rest),  write_terms(Rest);
```

```
      write(' '), write_terms(Rest)
     ), !.
% write_terms(List,Used): writes the terms in list and counts the number
%       of columns used; starts new line if 75 columns have been used
write_terms([],_) :- !.
% at end of list
write_terms([.], _) :- write('.'), nl,!.
write_terms([;],_) :- write(';'), nl,!.
% X is a punctuation, don't add to final count
write_terms([X|R],Used) :-
  ( R = [], write(' '), write(X), !;
    chkforpunct(X,R),
    write(X), write_terms(R,Used), !
  ).
% X is last word in sentence
write_terms([X,.], Used):-
   name(X, List), length(List, Len),
   Need is Len + 2,
   Total is Used + Need,
   (Total =< 75, write(' '),write(X), write(.);
    Total > 75, nl, write(' '),write(X), write(.)),
   nl, !.
% X is last word in sentence
write_terms([X,;], Used):-
   name(X, List), length(List, Len),
   Need is Len + 2,
   Total is Used + Need,
   (Total =< 75, write(' '),write(X), write(';');
    Total > 75, nl, write(' '),write(X), write(.)),
   nl, !.
% X is followed by ','
write_terms([X,','|Rest], Used):-
   name(X, List), length(List, Len),
   Need is Len + 2,
   Total is Used + Need,
   (Total =< 75, write(' '),write(X), write(','),
    write_terms(Rest, Total);
    Total > 75, nl, write(' '),write(X), write(','),
    New is Need - 1, write_terms(Rest, New)),
    !.
% writes blank + name of X, used is length of name+1
write_terms([X|Rest], Used):-
   name(X, List), length(List, Len),
   Need is Len + 1,
   Total is Used + Need,
   (Total =< 75, write(' '), write(X), write_terms(Rest, Total);
    Total > 75, nl, write(' '),write(X), write_terms(Rest, Len)),!.
write_terms(['X''s'|Rest], Used):-
   name(X, List), length(List, Len),
   Need is Len + 3,
   Total is Used + Need,
   (Total =< 75, write(' '), write(X),write("'s"),
    write_terms(Rest, Total);
    Total > 75, nl, write(X), write_terms(Rest, Len)),!.
% processes sentences in Infile; writes formats to Outfile
% sentences beginning with '%' are treated as comments
testsents(Infile,Outfile) :-
```

```
    see(Infile), seen, see(Infile),
    tell(Outfile),
    readtests,
    see(Infile), seen, told.
% reads next sentence and processes it
readtests :-
    read_in(X),
    (X = end_of_file, !;
     X = [eoff,'.'], !;
     X = [''], !;
     X = ['%'|_], !, readtests;  % don't process comments
     preprocess(X,Bs,Undef,Semlist,skip),
    ( Undef = [],
     dosent(X,Bs,Semlist,Fmt,Message,impression,W,chestxray,strict,0),
     write_sentence(X,1), write(Bs), nl,
     write(Fmt), nl;
     Undef \= [], write_sentence(X,1), write(Bs), nl, write(Undef), nl),
     readtests      % read next sentence
    ).
% Reads in all sentences from input file and creates one list of all sentences
get_inputsents(Prevlist,Toklist) :-
     read_in(X),
     (X = end_of_file, Toklist = Prevlist, !;
      X = [eoff,'.'], Toklist = Prevlist, !;
      X = [''], Toklist = Prevlist, !;
      (last('',X), append(Toklist,[''],X), !;   %remove
       append(Prevlist,X,Newlist),
       get_inputsents(Newlist,Toklist)
      )).

%get_sentence(+A,-B,-C)
% Gets next sentence from input list containing all sentences read in
% Don't end a sentence if "." is preceded by a number and followed by
% a number and unit measure - 1.25 cm, 1.5 cm, .5 cm
% or is followed by a "." which is part of abbreviation
% get_sentence(A,B,C) - A is list of all sentences in report
%                     - B is list containing one sentence
%                     - C is remainder excluding B
% sgml tag for multi-word phrase containing '.' that is not end of sentence
get_sentence(['<',phr|Tail],Sentence,LRest) :-
       enclosedPart(Tail,phr,Between,Rem), % Between beg. part of open phr and
close tag of phr
      append([sem,=,'"',Sem,'"'],MoreAttributes,Between),  %Sem is value of sem
attribute
      (MoreAttributes = ['>'|Phrase], TargetList = Phrase, !;
       MoreAttributes = [t,=,'"'|TargetPlus], % Target terms plus end of phr
       append(TargetList,['"','>'|Phrase],TargetPlus), !  % t attribute followed
by actual phrase
      ),
      Phrase = [W1|Rest],
      append(Phrase,SRest,Sentence),
      concat_atom(TargetList,Target),
      assert(phr(W1,Sem,Rest,Target)),  % assert lex def according to input
        %Phrase = [W1|PRest],
        %abbrev(W1,[W1|PRest],Target,_),
        get_sentence(Rem,SRest,LRest), !.
```

```
% Ignore sentence starting with '%', get next sentence
get_sentence(['%','%'|Rest],Sent,Remainder) :-
     get_sentence(Rest,_,Rem),
     get_sentence(Rem,Sent,Remainder).
get_sentence([X,.,Y,Z|Rest],[X,.],[Y,Z|Rest]) :-   % break up "140. 3+"
     number(X), number(Y), Z = '+', !.  % Y belongs to '+' for new sentence
get_sentence([X,.,Y,Z|Rest],[N|SRest],LRest) :-       % 1.5 cm
      number(X), number(Y),
      %(wdef(Z,unit,_); Z = x),
      Z \= '+',  % break up "140.  3+"
      !,
      name(X,D1), name(.,D2), name(Y,D3), name('E+00',D4),
      append([D1,D2,D3,D4],D), name(N,D), % put number together
      get_sentence([Z|Rest],SRest,LRest).
% common abbrev
get_sentence([X,.|Rest],[X|SRest],LRest) :-     % abbrev ending in "."
% list of common abbreviations seen in reports should not end sentence
   member(X,[vs,dr,cm,mg]), get_sentence(Rest,SRest,LRest), !.
% list of start of names in reports should not end sentence
get_sentence([X,.|Rest],[X|SRest],LRest) :-     % abbrev ending in "."
   member(X,[ms,mr,mrs,dr,st]),
   skipname(Rest,Rest0),    % skip name part
   get_sentence(Rest0,SRest,LRest), !.
% more known abbreviations
get_sentence([W1|Rest],[Rep|SRest],LRest) :-
     abbrevchk([W1|Rest],_,Rem,Rep),  %  abbreviation
     get_sentence(Rem,SRest,LRest), !.
% possible simple xml tag for new paragraph
get_sentence(['<',p,'/','>'|Rest],Sent,Rem) :-  %skip paragraph marker
    get_sentence(Rest,Sent,Rem), !.
% xml tag for sentence '<s>'
get_sentence(['<',s,'>'|Tail],Sentence,Rest) :-
      enclosedPart(Tail,s,Sent,Rest),
       (last('.',Sent), Sentence = Sent, !;   %already has '.'
       append(Sent,[.],Sentence)
       ), !.         %add '.'
get_sentence([.|Rest],[.],Rest) :- !.  %end of a sentence
get_sentence([;|Rest],[;],Rest) :- !.
% interior of sentence
get_sentence([X|Rest],[X|SRest],LRest) :-
                      get_sentence(Rest,SRest,LRest).
get_sentence([],[],[]).   % no more sentences

% abbrevchk(+WordList,-AbList,-RemList,-Target) is true if an abbrev is prefix
%   of WordList, RemList is suffix of WordList (excluding prefix),
%   AbList is prefix consisting of abbreviation
%   and Target is target form of abbreviation
abbrevchk([W1|Rest],AbList,RemList,Target) :-
     abbrev(W1,AbList,Target,Dom),  % abbrev knowledge base indexed by 1st word
     append(AbList,Rem,[W1|Rest]),  % remainder of abbrev. must be in sentence
     (Dom = general, !;     % abbrev. applies to all domains
      domain(Thisrep), Dom = Thisrep, !;  % abbrev. applies to this domain
      is_list(Dom), member(Thisrep,Dom)  % this domain in abbrev. list
     ),
     ( % add back '.' to sentence if it also signals end of sentence
       Rem = [], last('.',AbList), RemList = ['.'], !  %no more words
      ; % words that generally start a new sentence
```

```
        Rem = [W2|_], last('.',AbList),  member(W2,[his,her,he,she,the,this]),
          RemList = ['.'|Rem], !
          ;   % don't add '.' back
        RemList = Rem
      ).
% skipname(+Beglist,-Endlist): skips next word after "mr" or "st"
skipname([],[]) :- ! .
skipname([_,'''',s|Rest],Rest):- !.  % "Luke's"
skipname([o,'''',_|Rest],Rest):- !.  % "O'Grady
skipname([_|Rest],Rest) :- !.

%get_section(+Toklist,-Sents,-Rest,-Section,-Printname,Addno)
% Toklist contains input list; 1st sentence should be a header;
% Sents are all sentences in section; Section is name of section
% Sentences at beg. of Toklist are ignored until a section header is found
get_section([T|Toklist],Sents,Rest,Section,Printname,Addno) :-
       % first sentence should be section header
      get_sentence([T|Toklist],Sentence,RToklist),
      (section_header(Sentence,Rsent,Section,Printname), % Sentence is a section
header
       append(Rsent,RToklist,RToklist2),
       get_sectionsents(RToklist2,Sents,Rest),
       (Addno = 0, !;  % testing if input begins with section header
        Addno = 1, ! , sectno(Sectno), Newno is Sectno + 1,
        retractall(sectno(_)), assert(sectno(Newno))
       ),
       retractall(paragno(_)), assert(paragno(1)),  %1st parag. of section
       retractall(sentno(_)), assert(sentno(0))     %1st sentence of parag.
       ;   % 1st sentence is not a legitimate header - return []
        Section = []
       % get_section(RToklist,Sents,Rest,Section) % skip till find header
      ), !.

get_section([],[],[],[],_,_).
get_sectionsents([],[],[]) :-!.
get_sectionsents(Toklist,Slist,Rest) :-
     get_sentence(Toklist,Sentence,RToklist),  % one sentence
     (\+ section_header(Sentence,_,_,_), %more sentences in section
        get_sectionsents(RToklist,RSents,Rest),
        append(Sentence,RSents,Slist)
       ; % the next section is a section header - return
      Rest = Toklist, Slist = []).

section_header(S,RestS,'report clinical information item',
          'CLINICAL INFORMATION:.') :-
    (S = [clinical,information,':','.'], !, RestS = [];
     begsublist([clinical,information,':'],S,RestS), !;
     S = [clininfo,':','.'], RestS = [], ! ;
     begsublist([clininfo,':'],S,RestS), !
    ).
section_header(S,RestS,'report impression item',
            'IMPRESSION:.') :-
   (S = [impression,':',.], RestS = [], !;
    begsublist([impression,':'],S,RestS), !
   ).
section_header(S,Rest,'report summary item','SUMMARY:.') :-
    S = [summary,':'|Rest].
```

```
section_header(S,RestS,'report description item','DESCRIPTION:.') :-
   (S = [description,':',.], RestS = [], !;
    begsublist([description,':'],S,RestS), !
   ).
section_header(S,Rest,'report diagnosis item','DISCHARGE DIAGNOSIS:.') :-
   (S = [discharge,diagnosis,':'|Rest] ;
    S = [final,diagnosis,':'|Rest];
    S = [principle,diagnosis,':'|Rest]; S = [associated,diagnosis,':'|Rest];
    S = [transfer,diagnosis,':'|Rest];
    S = [diagnosis,'(',es,')',':'|Rest];
    S = [diagnosis,:|Rest]
   ), !.
section_header(S,Rest,'report laboratory data item','LAB DATA:.') :-
    S = [laboratory,data,':'|Rest], !.
section_header(S,Rest,'report medications item','MEDICATIONS:.') :-
    S = [medications,':'|Rest], !.
section_header(S,Rest,'report current medications item','MEDICATIONS:.') :-
    S = [current,medications,':'|Rest], !.
section_header(S,Rest,'report discharge medications item',
        'DISCHARGE MEDICATIONS:.') :-
    S = [discharge,medications,':'|Rest], !.
section_header(S,Rest,'report discharge disposition item',
     'DISCHARGE DISPOSITION:.') :-
    S = [discharge,disposition,':'|Rest], !.
section_header(S,Rest,'report medications on admission item',
     'MEDICATIONS:.') :-
    S = [medications,on,admission,':'|Rest], !.
section_header(S,Rest,'report medications on transfer iterm',
     'MEDICATIONS:.') :-
     S = [medications,on,transfer,':'|Rest], !.
section_header(S,Rest,'report procedure item','PROCEDURE:.') :-
  (S = [operation,':'|Rest]; S = [procedure,':'|Rest]
  ), !.

section_header(S,Rest,'report indications for procedure item','INDICATIONS:.')
:-
  (S = [indications,for,procedure,':'|Rest]; S =
[indications,for,operation,':'|Rest]
  ),
   !.

section_header(S,Rest,'report preoperative diagnosis item','PREOP DIAGNOSIS:.')
:-
   S = [preoperative,diagnosis,':'|Rest], !.
section_header(S,Rest,'report admitting diagnosis item','ADMITTING
DIAGNOSIS:.'):-
   S = [admitting,diagnosis,':'|Rest], !.
section_header(S,Rest,'report postoperative diagnosis item','DIAGNOSIS:.') :-
   S = [postoperative,diagnosis,':'|Rest], !.
section_header(S,Rest,'report physical examination item',
        'PHYSICAL EXAM:.') :-
   S = [physical,examination,':'|Rest], !.
section_header(S,Rest,'report chief complaint item','CHIEF COMPLAINT:.') :-
   S = [chief,complaint,':'|Rest], !.
section_header(S,Rest,'report hospital course item','HOSPITAL COURSE:.') :-
   S = [hospital,course,':'|Rest], !.
```

```
section_header(S,Rest,'report allergy item','ALLERGIES:.') :-
   S = [allergies,':'|Rest], !.

section_header(S,Rest,'report follow up item','FOLLOW UP:.') :-
   S = [follow,up,':'|Rest], !.
section_header(S,Rest,'report findings item','FINDINGS:.') :-
   S = [findings,':'|Rest], !.
section_header(S,Rest,'report indications and findings item','FINDINGS:.') :-
   S = [indications,and,findings,':'|Rest], !.
section_header(S,Rest,'report indications and findings item','INDICATIONS:.') :-
   S = [indications,':'|Rest], !.
section_header(S,Rest,'report provisional diagnosis item','PRELIM DIAGNOSIS:.')
:-
   S = [provisional,diagnosis,':'|Rest], !.
section_header(S,Rest,'report review of systems item','REVIEW OF SYSTEMS:.') :-
   S = [review,of,systems,':'|Rest], !.
section_header(S,Rest,'report past history item','PAST MEDICAL HISTORY:.') :-
   S = [past,history,section,':'|Rest], !.
section_header(S,Rest,'report past history item','PAST MEDICAL HISTORY:.') :-
   S = [past,medical,history,':'|Rest], !.
section_header(S,Rest,'report social history item','SOCIAL HISTORY:.') :-
   S = [social,history,':'|Rest], !.
section_header(S,Rest,'report past history item','PAST MEDICAL HISTORY:.') :-
   S = [history,':'|Rest], !.
section_header(S,Rest,'report past history item','PAST MEDICAL HISTORY:.') :-
   S = [brief,history,':'|Rest], !.
section_header(S,Rest,'report history of present illness item',
         'HISTORY OF PRESENT ILLNESS:.') :-
   S = [history,of,present,illness,':'|Rest], !.
section_header(S,Rest,'report history of present illness item',
         'HISTORY OF PRESENT ILLNESS:.') :-
   S = [history,of,the,present,illness,':'|Rest], !.
section_header(S,Rest,'report specimen item','SPECIMEN') :-
   S = [specimen|Rest], !.

% sentence consists of id number only or "." only.
isidentifier([X,.]) :-
        integer(X).
isidentifier([X,;]) :-
        integer(X).
isidentifier([.]) :- !.  % sentence consists only of .
isidentifier(['.','<eos>']) :- !.
isidentifier(['<',p,'/','>']) :-   % paragraph marker sentence - update no.
       paragno(N),
       retractall(paragno(_)),
       Newno is N + 1,
       assert(paragno(Newno)),
       retractall(sentno(_)),
       assert(sentno(0)).

% skipsentence is true, if sentence should be ignored.
% Skip sentences containing family info
skipsentence([X|_]) :-
   foundword(X,family), !.
skipsentence([X|_]) :-
   foundword(X,insurance), !.
% This occurs if sentence contains
```

```
% a sequence in skips database and sentence also contains findings.
skipsentence([X|Rest],Semlist,Error) :-
   skips([X|Sseq]),     % X is the beg. of subseq. in skip database
   prefix([X|Rest],[X|Sseq]), % sentence contains subseq.
   (subtype(_,Semlist),  % sentence contains information to be extracted
    Error = no;  % don't try to segment
    Error = yes), !.   % treat sentence as error and try to segment.

skipsentence([_|Rest],Semlist,Error) :-
   skipsentence(Rest,Semlist,Error).

% findingseg(+S,-Fseg,-Begseg): partitions sentence
%       S is the sentence; Begseg is the segment preceding the
%         modifiers of the finding; Fseg is the segment of S starting
%         with the leftmost modifier of the finding and consists of the
%         remaining sentence.
findingseg(S,Fseg,Begseg) :-
    partition(S,Begpart,Restpart),
    (Begpart = [], Begseg = [];
     Restpart = [], Fseg = [], Begseg = S;
    rightlstmod(Begpart,Begseg,Modseg)),
    append(Modseg,Restpart,Fseg).
findingseg(_,[],_) :- !.
actionfindingseg(S,Fseg,Begseg):-
      partition(S,Begpart,Restpart),
     (Begpart = [], Begseg = [];
      Restpart = [], Fseg = [], Begseg = S;
       reverse(Begpart, ReversedBefore),
           findsubstance(ReversedBefore,Rest),
           append(Substancepart,Rest,ReversedBefore),
           reverse(Substancepart,Leftpart),
         reverse(Rest,Begseg),
       append(Leftpart,Restpart,Fseg)).
actionfindingseg(_,[],_) :- !.
findsubstance([],[]):- !.
findsubstance([X|Rest],Rest):-
      substance(_,[X],[]),!.
findsubstance([X|Rest1],Rest):-
      findsubstance(Rest1,Rest).

% partition(+S,-Begpart,-Restpart): partitions sentence
%       S is initial
% partition(+S,-Begpart,-Restpart): partitions sentence
%       S is initial sentence; Begpart is part of sentence before the
%         finding; Restpart is the rest of the sentence and starts with
%         the finding. If there are 2 consecutive findings
%         the 1st one is considered a modifier
partition([],[],[]) :- !.
partition([X|Rest],[X|Begpart],Restpart) :-
    not(isfinding(X)), !, partition(Rest,Begpart,Restpart).
partition([X,Y|Rest],[X],[Y|Rest]) :-
    isfinding(X), isfinding(Y), !.
partition([X|Rest],[],[X|Rest]) :-
    isfinding(X), !.

% isfinding(+X): is true if X is a word or phrase whose semantic class
%       is a finding or subtype of finding.
```

```
isfinding(X) :-
     foundword(X,Sem),    % semantic class of word
     subtype(_,[Sem]).     % is class a type of finding, recommend, or technique
% semantic class which are types of relevant information
subtype(finding,Sem) :-
     intersect(Sem,[attach, createbond, breakbond,activate,
      inactivate,substitute,transcribe,express,promote,
      signal]).
% there is only one type of technique class
subtype(technique,Sem) :-
     member(technique,Sem).
subtype(time,Sem) :-
     intersect(Sem,[status,sstatus,change,tmper,vstatus]).
findinginlist(Sem) :-
    intersect(Sem, [attach, createbond, breakbond,activate,
      inactivate,substitute,transcribe,express,promote,
      signal]).

% chkforpunct(+W,+Rest): is true if there should be no space after word W
chkforpunct(W,_) :- member(W,['/','<','>','-','"','[',']',
                '{','}','_','+','=','|','\']), !.
% nothing left to write.
chkforpunct(W,[]) :-!.
% is true if there should be no space before word after current word
chkforpunct(_,[W|_]) :-
   ispunct(W).
% ispunct(+W) is true if W is a punctuation for sentence print out
%  The following characters are not treated as punct: ~ ` # $ ^ & *
ispunct(W) :- member(W,[',','.',';','/','<','>','?','''',-',':','"','[',']',
                '{','}','(',')','_','+','=','|','\','%','@']).
% rightlstmod(List,Firstpart,Modpart): Modpart begins with the first
%   word in List which is a modifier; Firstpart are the preceding words
rightlstmod([],[],[]) :- !.
% X is a modifier or finding; Beginning part is empty
rightlstmod([X|Rest],[],[X|Rest]) :-
   foundword(X,Sem,Target),
   (modifier(Sem); Sem = p, Target = [_,conn]; subtype(_,[Sem])), !.
% X is not a modifier or finding
rightlstmod([X|Rest],[X|Firstpart],Modpart) :-
   rightlstmod(Rest,Firstpart,Modpart).

% frame(Frame,Type,Value,Mods): creates a list Frame, whose 1st
%       element is Type, 2nd element is Value, and 3rd is a list of
%       modifier frames or is emtpy
% Case where modifier list is empty; Value should be atom except for
% certain types;
frame([Type,Value],Type,Value,X) :-
    (X = []; X = [[]]),
    atom(Value), !.
% Special cases where value of type should be a list
frame([Type,[H|R]],Type,[H|R],X) :-
       (X = []; X = [[]]),
       oklist(Type), !.
% Modifier list is merged with list consisting of Type and Value
frame(Frame,Type,Value,Mods) :-
     atom(Value),
     append([Type,Value],Mods,Frame), !.
```

```
frame(Frame,Type, [H|R], Mods):-
    is_list(R),
    append(R, Mods, NewMods),
    append([Type, H], NewMods, Frame), !.
% Components of Frame
frame([Type,Value|Mods],Type,Value,Mods) :- !.
% Value of Type should not be a list; first element of value is real value
frame([Type,H,Rest],Type,[H|Rest],[]) :- !.
% Special cases where value of type should be a list
%frame([Type,[H|R]],Type,[H|R],[]) :-   %repeated from rule above
%   oklist(Type), !.
% Value of Type should not be a list; first element of value is real value
frame(Frame,Type,[H|Rest],Mods) :-
    mergemods(Rest,Mods,NewMods),
    append([Type,H],NewMods,Frame).

% mergemodinf(-F,+Frame,+Mods): Frame is a type-value-mod frame; Mods
%   is an additional set of modifiers for Frame; mergemodinf adds Mods
%   to Frame, resulting in F.
mergemodinf([],[],_):-!.
mergemodinf(F,[rel,X|Rest],Modrel):-
        mergemodinf(F1, Rest, Modrel),
        append([rel,X],F1,F),!.
mergemodinf(F,[F1,X|Modfin],Modrel):-
        atom(F1),mergemods(Modrel, Modfin, Mod),
        append([F1,X],Mod,F),!.
mergemodinf(F,[H|R],Modrel):-
        mergemodinf(F1,H,Modrel),
        mergemodinf(F2,R,Modrel),
        append([F1],F2,F).
% addmodstof(+Args,+Mods,-NewArgs) is true if Args is a list of formats,
% Mods is a list of modifiers and NewArgs is a list of formats where Mods
% has been added to modifier list of that format
addmodstof([],_,[]) :- !.   % no more formats
addmodstof([Format1|Rest],Mods,[F1|NewRest]) :-
       mergemodinf(F1,Format1,Mods),  % merge modifiers into 1st format
       addmodstof(Rest,Mods,NewRest), !.  %add modifier to remaining
% oklist(+Type): is true if Type can have a list as its value
oklist(unitval).
oklist(age).
oklist(measure).
oklist(prev_timeunit).
oklist(future_exam).

% mergemods(+Mods1,+Mods2,-Mod): Mods1 and Mods2 are a list of modifier lists
%       Mod is the merged list; some elements of Mods1 and Mods2 may be
%       empty
mergemods([],M,M) :- !.
mergemods(M,[],M).
mergemods(Mods1,Mods2,Mod) :-
        delete(Mods1,[],M1),
        delete(Mods2,[],M2),
        append(M1,M2,Mod).

% addmod(+Mod,+Modlist,-NewMod): NewMod is formed by including
%       Mod into Modlist
addmod([],Mod,Mod) :-!.
```

```
addmod(Mod,[],[Mod]) :- !.
addmod(Mod,Modlist,NewMod) :-
   append([Mod],Modlist,NewMod).
% modlist(+ListofMods,-Mods): ListofMods is a list consisting of
%   individual modifier frames, some of which may be empty
%   Mods is formed as a list of non-empty modifiers
modlist([],[]) :- !.
% ignore a modifier which is an empty list
modlist([[]|R],Mods) :-
    modlist(R,Mods), !.
modlist([[H|R1]|R2],Mods) :-
    atom(H), !,
    modlist(R2,Rmods),
    addmod([H|R1],Rmods,Mods).
modlist([[H|R1]|R2],Mods) :-
    is_list(H), !, % is first element is a list
    modlist(R2,Rmods),
    mergemods([H|R1],Rmods,Mods).

%bpframe: creates from for sequences of bodyloc/region/position
bpframe(F,[],_,F,[]):- !.  % only 1 bodyloc
bpframe(F,[],Type,Bp1,Bp2) :-  % no conj relation but more than 1 bodyloc
        frame(Bp1,Bp1Type,Bp1Val,Bp1Mods),  %contents of Bp1 frame
        frame(Bp2,Bp2Type,Bp2Val,Bp2Mods),  %contents of Bp2 frame
        ( (Bp1Type = region; Bp1Type = position),
         Bp2Type = bodyloc, % 'left lung', 'area of lung'
         mergemods(Bp1Mods,Bp2Mods,BpMods),  %new region modifier
         frame(NewBp2Mods,Bp1Type,Bp1Val,BpMods), %new Bp1 frame w new mod
         frame(F,Bp2Type,Bp2Val,[NewBp2Mods])    % main frame is bodyloc
          ;
         Bp1Type = bodyloc, Bp2Type = bodyloc, Type = main, %Bp2 is main
         mergemods(Bp1Mods,Bp2Mods,BpMods),  %new bodyloc modifier
         frame(NewBp2Mods,Bp1Type,Bp1Val,BpMods), % 'joint of shoulder'
         frame(F,Bp2Type,Bp2Val,[NewBp2Mods])       % main bp frame is shoulder
          ;
         mergemods(Bp1Mods,Bp2Mods,BpMods),
         frame(NewBp1Mods,Bp2Type,Bp2Val,BpMods), % 'shoulder joint'
         frame(F,Bp1Type,Bp1Val,[NewBp1Mods])       % main bp frame is shoulder
        ), !.
bpframe(F,Rel,_,Bp1,Bp2) :-  % no conj relation but more than 1 bodyloc
        Rel = [rel,Conj|_], Bp2 \= [],
        mergemods([Bp1],[Bp2],Conjargs),
        frame(F,rel,Conj,Conjargs).

getrelation(R,F1,F2,F) :-
        (F2 \= [],
            (F1 = [rel,Conj1|Rest1], R = [rel,Conj],
                                (Conj1 = ','; Conj1 = or; Conj1 = and),
                                (Conj = ','; Conj = or; Conj = and);
              Rest1 = [F1]),
            (F2 = [rel,Conj2|Rest2],
                                (Conj2 = ','; Conj2 = or; Conj2 = and);
              Rest2 = [F2]),
            %splice([R,Rest1,Rest2],F);
             append([R,Rest1,Rest2],F);
         F2 = [], F = F1 ).
```

```
uptotal :-
   addstotal(X),
   X =< 50,
   NewX is X + 1,
   retractall(addstotal(X)),
   assert(addstotal(NewX)), !.
```

Appendix E

```
$save{'a'}='AAAC';
$save{'b'}='AAAG';
$save{'c'}='AAAT';
$save{'d'}='AACC';
$save{'e'}='AACG';
$save{'f'}='AACT';
$save{'g'}='AAGC';
$save{'h'}='AAGG';
$save{'i'}='AAGT';
$save{'j'}='AATC';
$save{'k'}='AATG';
$save{'l'}='AATT';
$save{'m'}='ACAC';
$save{'n'}='ACAG';
$save{'o'}='ACAT';
$save{'p'}='ACCC';
$save{'q'}='ACCG';
$save{'r'}='ACCT';
$save{'s'}='ACGC';
$save{'t'}='ACGG';
$save{'u'}='ACGT';
$save{'v'}='ACTC';
$save{'w'}='ACTG';
$save{'x'}='ACTT';
$save{'y'}='AGAG';
$save{'z'}='AGAT';
$save{'0'}='AGCC';
$save{'1'}='AGCG';
$save{'2'}='AGCT';
$save{'3'}='AGGC';
$save{'4'}='AGGG';
$save{'5'}='AGGT';
$save{'6'}='AGTC';
$save{'7'}='AGTG';
$save{'8'}='AGTT';
$save{'9'}='ATAT';
$save{' '}='ATCC';
$save{']'}='ATCC';
$save{'['}='ATCC';
$save{';'}='ATCC';
$save{':'}='ATCC';
$save{'"'}='ATCC';
$save{'\''}='ATTC';
$save{'?'}='ATCC';
$save{'!'}='ATCC';
$save{'#'}='CCCG';
$save{'$'}='CCCT';
$save{'^'}='CCGG';
$save{'&'}='CCGT';
$save{'*'}='CCTG';
$save{'('}='ATCC';
$save{')'}='ATCC';
```

NY02:257372.1

```
$save{'_'}='CGCT';
$save{'-'}='ATCC';
$save{'+'}='CGGT';
$save{'='}='CGTG';
$save{')'}='CGTT';
$save{'('}='CTCT';
$save{','}='ATCC';
$save{'.'}='ATCC';
$save{'|'}='CTTG';
$save{'%'}='CTTT';
$save{'/'}='ATCC';
$save{'\\'}='GGTT';
$save{'@'}='GTGT';
$save{"\n"}='ATCC';
$save{'<'}='GTTT';
$save{'>'}='GTTT';
$save{'~'}='GTTT';
```

Appendix F

```
#!/usr/bin/perl
#Scan.pl : Scans blast output
#Author: Michael Krauthammer
#Copyright: c.1999, Columbia University

#Variables

#blast input/file
$input_file="genebank.result";
#program output
$output_file="match.txt";

#open datastream for file which contains blast output
    open (INPUT,'/storage/psi-blast/MarkIt/programs/markIt.result');

while ($line=<INPUT>){
    if ($line=~/\>gi\|(\d*) (.*)\,(.*)\,(.*)/){
   $target=$4;
   $gi =$1;
   $semantic_class=$3;
    }
    if($line=~/Length = (.*)/){
   $lengthI=$1;
    }
    if ($line=~/Identities \= (\d*)\//){
   $length_actual=$1
    }
    if ($line=~/Query: (\d*)/){
   $start=$1;
    }
#print if Subj 1, sometimes match 2 or 3 line long

    if ($line=~/Sbjct: 1 /){
   if (($length_actual/$lengthI) > .9){
   print
$target,"|",$start,"|",$start+$lengthI,"|",$semantic_class,"|",$gi,"\n";
    }
    }
}
```

Appendix G

```
#!/usr/bin/perl
#nucleotide_text_parser.pl
#Author: Michael Krauthammer, c.1999 Columbia University

open (INPUT,$ARGV[0]);

#read uncoded input text line by line (chop it)
$all='';
while ($line=<INPUT>){
    $all=$all.$line;
   }
open (INPUTII,'/storage/psi-blast/MarkIt/programs/markItII.result');
open (OUTPUT,'>result.txt');
#first part: check matches, store positions

while ($line=<INPUTII>){

($name,$start,$end,$semantic_class,$gi)=$line=~/(.*)\|(.*)\|(.*)\|(.*)\|(.*)/;

#divide by 4 (4 letter code)
$start=($start-1)/4;
$end=($end-1)/4;

#get substring
if ($start != 0){
$letters=substr($all,$start-1,$end-$start+3)."|";
} else {
$letters = ' '.substr($all,0,$end+2)."|";
}
($letter_beginning)=$letters=~/(^.)/;
$letter_end=substr($all,$end,1);
$letter_endII=substr($all,$end,2);
#ignore matches that are in the MIDDLE of sentences, allow plurals
$letter_beginning=~tr/[A-Z]/[a-z]/;
$letter_end=~tr/[A-Z]/[a-z]/;
if ((!($letter_beginning=~/[a-z]/)) && ((!($letter_end=~/[a-z]/)) ||
($letter_endII=~/s /))){

#make sure only the first occurence is stored at  this position
   if ($save{$start}==''){
   $save{$start}=$end.'|'.$semantic_class.'|'.$gi;
   }
         foreach $key(keys(%save)){
   ($end_key)=$save{$key}=~/^(.*)\|/;
   if ($end_key>$end){
      if ($key<$start){
         $save{$start}='null',
       }
   }
    }
}
}
```

```
#second part: print out marked up document
sort(%save);
for ($i=0;$i<length($all);$i++){
    if ((!$save{$i}=='null') && ($save{$i}=~/./)){
   ($end,$semantic_class)=$save{$i}=~/(.*)\|(.*)\|/;
   print OUTPUT '<phr="',$semantic_class,'">';
   $store=substr($all,$i,$end-$i);
   print OUTPUT $store;
   print OUTPUT "</phr>";
   $i=$end-1;
    } else {
   $store=substr($all,$i,1);
   print OUTPUT $store;

    }
}
```

```
HMMER2.0
NAME ARMrpt.txt
DESC
LENG  55
ALPH  Amino
RF    no
CS    no
COM   [converted from an old Plan9 HMM]
NSEQ  0
DATE  Mon Mar  8 11:39:08 1999
XT      -8455     -4  -1000  -1000  -8455     -4  -8455     -4
NULT      -4  -8455
NULE     595  -1558     85    338   -294    453  -1158    197    249    902  -1085   -142    -21   -313     45    531    201    384  -1998   -644
HMM        A      C      D      E      F      G      H      I      K      L      M      N      P      Q      R      S      T      V      W      Y

         m->m   m->i   m->d   i->m   i->i   d->m   d->d   b->m   m->e
        -2188      *   -357
     1  -1319   -546    894  -1877  -1561  -1153   -940   1578  -1087  -1655  -2202    832  -1485   1805  -1860  -1579  -1499   1882  -1780  -1622
     -    206    979   -178   -352    -36    372    585   -635    438   -130   -677   -164     41    -73   -335    -54     27    -12   -255    -97
     -     -3  -9395 -10395   -732  -1329  -2823   -220  -2188      *
     2    409   -681  -1208  -1083    305  -1288  -1075   1842  -1222    691  -2336   -580  -1619   2198  -1995  -1714  -1633    -38  -1915  -1757
     -    206    979   -178   -352    -36    372    585   -635    438   -130   -677   -164     41    -73   -335    -54     27    -12   -255    -97
     -     -3  -9582 -10582   -732  -1329  -4299    -75      *      *
     3    446   -681   1026   -344  -1696  -1288  -1075   1009  -1222  -1790  -2336   1945  -1619  -1733  -1995  -1269   -700   1696  -1915  -1757
     -    206    979   -178   -352    -36    372    585   -635    438   -130   -677   -164     41    -73   -335    -54     27    -12   -255    -97
     -     -3  -9582 -10582   -732  -1329  -3809   -107      *      *
     4    765   2349    182  -2039  -1723  -1315  -1102   1207  -1249    255  -2364  -1851  -1646  -1760    486  -1741   -267   1553  -1942  -1784
     -    206    979   -178   -352    -36    372    585   -635    438   -130   -677   -164     41    -73   -335    -54     27    -12   -255    -97
     -     -3  -9620 -10620   -732  -1329  -4269    -77      *      *
     5    197   -708    698  -2039  -1723    888  -1102   1691  -1249   -390  -2364   1835  -1646    262  -2022   -270  -1660   -808  -1942  -1784
     -    206    979   -178   -352    -36    372    585   -635    438   -130   -677   -164     41    -73   -335    -54     27    -12   -255    -97
     -     -3  -9620 -10620   -732  -1329  -2431   -296      *      *
     6    171   2253    498  -1592  -1870    195  -1249   1263  -1103  -1964    474    550    -69     34  -2169    -39  -1808   1232  -2089  -1931
     -    206    981   -178   -351    -36    372    584   -636    437   -129   -677   -164     40    -71   -336    -53     26    -12   -256    -97
     -   -4216    -81 -10816    -30  -5612  -3946    -97      *      *
     7   1399   -920     95  -2251  -1935    972  -1314   1039  -1461  -2029  -2575   -788    816    166    157  -1271  -1872    989  -2154  -1995
     -    206    979   -178   -352    -36    372    585   -635    438   -130   -677   -164     41    -73   -335    -54     27    -12   -255    -97
     -     -2  -9899 -10899   -732  -1329  -2057   -396      *      *
     8     26   1286  -2209  -2382   -330    324  -1445    982  -1592    370  -2707  -2194    844  -2103    665   -620  -2003   1711  -2285  -2127
     -    206    979   -178   -352    -36    372    585   -635    438   -130   -677   -164     41    -73   -335    -54     27    -12   -255    -97
     -     -2 -10066 -11066   -732  -1329  -2046   -400      *      *
     9  -1917    642  -2302   -732   -240  -1751  -1538    896     61   1533  -2800  -2287    886   1377   -350  -2177  -2096    825  -2378  -2220
     -    206    979   -178   -352    -36    372    585   -635    438   -130   -677   -164     41    -73   -335    -54     27    -12   -255    -97
     -     -2 -10183 -11183   -732  -1329  -2258   -338      *      *
```

10	-626	1137	505	-783	317	-1800	-1587	606	-840	77	-2849	8	1358	802	779	-985	-2145	788	-2427	-2269
-	206	979	-178	-352	-36	372	585	-635	438	-130	-677	-164	41	-73	-335	-54	27	-12	-255	-97
-	-2	-10243	-11243	-732	-1329	-1983	-421	*	*											
11	-504	1916	85	211	-290	-1851	1259	-110	-1052	719	516	-2388	-235	-243	95	197	-2197	1042	-2478	-2320
-	206	979	-178	-352	-36	372	585	-635	438	-130	-677	-164	41	-73	-335	-54	27	-12	-255	-97
-	-2	-10305	-11305	-732	-1329	-2912	-206	*	*											
12	-2017	-1244	-229	-447	695	-2	-1638	1452	-300	1493	-2900	-2388	-2183	-2296	-2558	-386	-2197	1266	-2478	-2320
-	206	979	-178	-352	-36	372	585	-635	438	-130	-677	-164	41	-73	-335	-54	27	-12	-255	-97
-	-2	-10305	-11305	-732	-1329	-1266	-775	*	*											
13	-1487	-1381	-1377	1340	1111	-1989	574	1294	-617	1387	-1622	-2525	-782	-400	-2696	-2415	-2334	731	-2615	-2457
-	206	979	-178	-352	-36	372	585	-635	438	-130	-677	-164	41	-73	-335	-54	27	-12	-255	-97
-	-2	-10480	-11480	-732	-1329	-417	-1994	*	*											
14	-332	-1506	667	-492	-525	-843	854	-107	-477	812	543	-165	-706	1408	-2145	189	-2459	743	-786	-2582
-	206	979	-178	-352	-36	372	585	-635	438	-130	-677	-164	41	-73	-335	-54	27	-12	-255	-97
-	-1	-10629	-11629	-732	-1329	-1232	-800	*	*											
15	-86	-948	-1755	-449	-642	765	1262	485	-569	1116	-3162	-2273	58	-72	-1071	729	-525	-899	-2740	-958
-	206	979	-178	-352	-36	372	585	-635	438	-130	-677	-164	41	-73	-335	-54	27	-12	-255	-97
-	-1	-10629	-11629	-732	-1329	-656	-1453	*	*											
16	-25	-1526	-2683	135	-292	264	677	-262	143	640	1292	-84	-487	167	-2840	-978	-859	1368	-2760	-2602
-	206	979	-178	-352	-36	372	585	-635	438	-130	-677	-164	41	-73	-335	-54	27	-12	-255	-97
-	-1	-10652	-11652	-732	-1329	-42	-5132	*	*											
17	-536	793	-209	-465	-47	-1813	410	1703	145	494	-479	120	-2495	511	-904	-60	-128	8	-2791	-2633
-	206	979	-178	-352	-36	372	585	-635	438	-130	-677	-164	41	-73	-335	-54	27	-12	-255	-97
-	-74	-10688	-4334	-732	-1329	-76	-4293	*	*											
18	-382	-1495	1353	-1441	-657	389	1248	-642	-500	-495	-244	1034	1035	-406	-174	463	-2447	-1430	-2729	228
-	206	979	-178	-352	-36	372	585	-635	438	-130	-677	-164	41	-73	-335	-54	27	-12	-255	-97
-	-51	-10615	-4886	-732	-1329	-28	-5677	*	*											
19	913	2484	-219	359	-2532	-1164	1125	-3132	479	-928	-3173	975	790	-2317	837	-804	-2300	-458	-2751	-9
-	206	979	-178	-352	-36	372	585	-635	438	-130	-677	-164	41	-73	-335	-54	27	-12	-255	-97
-	-51	-10642	-4871	-732	-1329	-37	-5317	*	*											
20	-2289	110	229	-1825	140	767	1482	-3130	-614	95	21	443	-2455	-94	269	250	240	1059	-2750	-43
-	206	979	-178	-352	-36	372	585	-635	438	-130	-677	-164	41	-73	-335	-54	27	-12	-255	-97
-	-44	-10640	-5097	-732	-1329	-36	-5357	*	*											
21	-1533	666	-2680	-928	722	-1728	-1916	528	-281	875	358	-274	1371	-539	-288	-1571	-2474	1458	-2756	-200
-	206	979	-178	-352	-36	372	585	-635	438	-130	-677	-164	41	-73	-335	-54	27	-12	-255	-97
-	-27	-10647	-5824	-732	-1329	-39	-5231	*	*											
22	-766	-285	-2694	590	-948	-1182	-1930	834	584	163	506	-63	-518	-530	-372	618	655	262	-2770	-365
-	206	979	-178	-352	-36	372	585	-635	438	-130	-677	-164	41	-73	-335	-54	27	-12	-255	-97
-	-107	-10664	-3822	-732	-1329	-48	-4924	*	*											
23	-1378	-1469	-1334	-2089	1114	-2076	1292	-832	1032	476	-3125	-2612	1427	876	389	328	-139	-339	-2703	-2545
-	206	979	-178	-352	-36	372	585	-635	438	-130	-677	-164	41	-73	-335	-54	27	-12	-255	-97
-	-28	-10585	-5756	-732	-1329	-23	-6013	*	*											
24	-1282	774	-1377	443	101	76	-1223	-151	-806	514	-1530	-658	805	-377	493	-249	3	1071	-2770	-2612
-	206	979	-178	-352	-36	372	585	-635	438	-130	-677	-164	41	-73	-335	-54	27	-12	-255	-97

-	-97	-10664	-3960	-732	-1329	-48	-4928	*	*										
25	1067	-1202	-37	-502	196	-2084	-1871	-301	590	1399	-3133	-856	-2416	1773	-473	-1253	-1435	-2005	-2711	-2553
-	206	979	-178	-352	-36	372	585	-635	438	-130	-677	-164	41	-73	-335	-54	27	-12	-255	-97
-	-60	-10594	-4642	-732	-1329	-24	-5923	*	*										
26	-444	937	-1062	179	1131	-1717	441	6	225	694	-1542	435	358	690	-627	224	-2463	-39	-2744	-2586
-	206	979	-178	-352	-36	372	585	-635	438	-130	-677	-164	41	-73	-335	-54	27	-12	-255	-97
-	-1	-10633	-11633	-732	-1329	-33	-5450	*	*										
27	1410	-1557	-891	1052	-323	-589	-606	-3171	-578	-60	-3213	-268	412	271	105	99	-2087	-2548	2818	-2633
-	206	979	-178	-352	-36	372	585	-635	438	-130	-677	-164	41	-73	-335	-54	27	-12	-255	-97
-	-1	-10688	-11688	-732	-1329	-76	-4293	*	*										
28	1615	923	-891	228	-1126	-884	555	-1357	-461	451	-3213	-2700	-2495	-96	-2871	261	583	9	1503	-1076
-	206	979	-178	-352	-36	372	585	-635	438	-130	-677	-164	41	-73	-335	-54	27	-12	-255	-97
-	-51	-10688	-4878	-732	-1329	-76	-4293	*	*										
29	913	466	-157	-2846	-103	-2122	-1909	607	-1272	1219	-622	-2658	-562	-2567	281	-462	-2467	-113	2781	767
-	206	979	-178	-352	-36	372	585	-635	438	-130	-677	-164	41	-73	-335	-54	27	-12	-255	-97
-	-39	-10639	-5257	-732	-1329	-36	-5358	*	*										
30	964	-1526	-2080	-298	-772	-245	-1920	-3140	134	-769	-1299	-291	895	718	-510	763	914	-2517	2685	-2602
-	206	979	-178	-352	-36	372	585	-635	438	-130	-677	-164	41	-73	-335	-54	27	-12	-255	-97
-	-37	-10652	-5357	-732	-1329	-42	-5132	*	*										
31	-26	-1528	-458	-771	-166	-1713	716	-1310	835	-704	-3183	1766	-935	-541	-324	264	589	370	1969	-2440
-	206	979	-178	-352	-36	372	585	-635	438	-130	-677	-164	41	-73	-335	-54	27	-12	-255	-97
-	-51	-10654	-4884	-732	-1329	-42	-5131	*	*										
32	340	-1516	41	355	-2531	-188	628	1489	-450	377	-3172	439	-1060	-1176	-2830	-104	502	-840	-2750	167
-	206	979	-178	-352	-36	372	585	-635	438	-130	-677	-164	41	-73	-335	-54	27	-12	-255	-97
-	-73	-10640	-4352	-732	-1329	-35	-5363	*	*										
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-	206	979	-178	-352	-36	372	585	-635	438	-130	-677	-164	41	-73	-335	-54	27	-12	-255	-97
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-	-26	-10609	-5858	-732	-1329	-27	-5771	*	*										
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-	-12	-10665	-7013	-732	-1329	-50	-4882	*	*										
36	1213	-1548	-447	228	-168	-29	-1942	336	75	-2134	-2379	130	-2166	-141	396	390	962	-180	-2782	-2623
-	206	979	-178	-352	-36	372	585	-635	438	-130	-677	-164	41	-73	-335	-54	27	-12	-255	-97
-	-16	-10677	-6625	-732	-1329	-65	-4498	*	*										
37	1439	628	-444	-407	-147	829	-1939	638	-2086	121	-318	-2688	-2483	-2597	-279	687	405	-1121	-2779	-2621
-	206	979	-178	-352	-36	372	585	-635	438	-130	-677	-164	41	-73	-335	-54	27	-12	-255	-97
-	-91	-10674	-4054	-732	-1329	-62	-4563	*	*										
38	711	-1482	-650	-502	-2497	884	-1876	-553	-519	-1267	-3137	-111	-2420	1538	-672	992	353	-308	2122	-2557
-	206	979	-178	-352	-36	372	585	-635	438	-130	-677	-164	41	-73	-335	-54	27	-12	-255	-97
-	-86	-10600	-4127	-732	-1329	-1206	-820	*	*										
39	842	-1424	306	59	-270	-23	-1818	-1813	508	-2473	-3080	1423	-845	1191	388	-2457	569	-2415	2553	-2307

-	206	979	-178	-352	-36	372	585	-635	438	-130	-677	-164	41	-73	-335	-54	27	-12	-255	-97
-	-193	-10531	-3005	-732	-1329	-1208	-818	*	*											
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-	206	979	-178	-352	-36	372	585	-635	438	-130	-677	-164	41	-73	-335	-54	27	-12	-255	-97
-	-74	-10391	-4344	-732	-1329	-2887	-209	*	*											
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-	206	979	-178	-352	-36	372	585	-635	438	-130	-677	-164	41	-73	-335	-54	27	-12	-255	-97
-	-193	-10318	-3008	-732	-1329	-3118	-177	*	*											
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-	-211	-10125	-2887	-732	-1329	-3580	-126	*	*											
43	-502	-928	-2086	-2259	-1943	956	-1322	913	-1469	475	-2584	1310	-1867	1031	-286	-1961	-1881	-1919	3900	-2004
-	206	979	-178	-352	-36	372	585	-635	438	-130	-677	-164	41	-73	-335	-54	27	-12	-255	-97
-	-80	-9916	-4248	-732	-1329	-3955	-96	*	*											
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-	206	979	-178	-352	-36	372	585	-635	438	-130	-677	-164	41	-73	-335	-54	27	-12	-255	-97
-	-2	-9837	-10837	-732	-1329	-4047	-90	*	*											
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-	-2	-9837	-10837	-732	-1329	-4047	-90	*	*											
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-	206	979	-178	-352	-36	372	585	-635	438	-130	-677	-164	41	-73	-335	-54	27	-12	-255	-97
-	-63	-9837	-4578	-732	-1329	-4047	-90	*	*											
47	897	-821	6	-2153	-1837	980	-1216	-2436	-1363	-1931	711	2510	-1760	1679	-2135	-1855	-164	-972	-2055	-1897
-	206	979	-178	-352	-36	372	585	-635	438	-130	-677	-164	41	-73	-335	-54	27	-12	-255	-97
-	-249	-9775	-2669	-732	-1329	-4113	-86	*	*											
48	-631	-637	196	-945	-1652	602	-1031	1924	-1178	-417	-662	530	-1575	-1689	311	725	208	-1175	-1871	-1219
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-	-3	-9522	-10522	-732	-1329	-4329	-74	*	*											
49	745	1264	767	-186	-1652	333	-1031	631	-1178	-1746	-2292	-491	-34	685	-1951	-172	1213	-120	-1871	-1712
-	206	979	-178	-352	-36	372	585	-635	438	-130	-677	-164	41	-73	-335	-54	27	-12	-255	-97
-	-85	-9522	-4167	-732	-1329	-4329	-74	*	*											
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-	206	979	-178	-352	-36	372	585	-635	438	-130	-677	-164	41	-73	-335	-54	27	-12	-255	-97
-	-339	-9438	-2267	-732	-1329	-4386	-71	*	*											
51	-1115	-342	-1500	-1673	-1357	2507	-736	-1956	-883	-776	-1998	-1485	-1281	2079	-1656	453	-1295	-1333	-1576	-1418
-	206	979	-178	-352	-36	372	585	-635	438	-130	-677	-164	41	-73	-335	-54	27	-12	-255	-97
-	-401	-9082	-2055	-732	-1329	-4571	-62	*	*											
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-	206	979	-178	-352	-36	372	585	-635	438	-130	-677	-164	41	-73	-335	-54	27	-12	-255	-97
-	-247	-8635	-2692	-732	-1329	-4719	-56	*	*											
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-	-87	-8304	-4173	-732	-1329	-4781	-53	*	*											

54	215	97	-228	-4	-919	-511	-298	-547	642	-67	-1559	510	1464	179	-1218	632	-856	-895	-1137	-979
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-	-124	-8234	-3662	-732	-1329	-4807	-52	*	*											
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-	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*
-	*	*	*	*	*	*	*	*	0											

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HMMER2.0
NAME ASP-GLU
DESC
LENG  87
ALPH  Amino
RF    no
CS    no
COM   [converted from an old Plan9 HMM]
NSEQ  0
DATE  Mon Mar  8 11:41:44 1999
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NULT      -4  -8455
NULE     595  -1558     85    338   -294    453  -1158    197    249    902  -1085   -142    -21   -313     45    531    201    384  -1998   -644
HMM        A      C      D      E      F      G      H      I      K      L      M      N      P      Q      R      S      T      V      W      Y

         m->m   m->i   m->d   i->m   i->i   d->m   d->d   b->m   m->e
        -3647      *   -120
     1   -447    326   -832    519   -689   -281    -68  -1289    624   1235   -196   -818   -613   1006   -988     64   -627   -666   -908   -750
     -    206    979   -178   -352    -36    372    585   -635    438   -130   -677   -164     41    -73   -335    -54     27    -12   -255    -97
     -    -10  -7736  -8736   -732  -1329  -3599   -124  -3647      *
     2   -466    307   -160    619   -708   -300    -87  -1307   -234    789    -88   -836   -205   -745  -1007   -726     58   -297   3349   -769
     -    206    979   -178   -352    -36    372    585   -635    438   -130   -677   -164     41    -73   -335    -54     27    -12   -255    -97
     -    -10  -7775  -8775   -732  -1329  -3775   -109      *      *
     3   -466    307   -851     92    237   -300    -87  -1307   -234      3    212   -836   1016   -203  -1007   1189    677   -684   -927   -769
     -    206    979   -178   -352    -36    372    585   -635    438   -130   -677   -164     41    -73   -335    -54     27    -12   -255    -97
     -    -10  -7775  -8775   -732  -1329  -2765   -230      *      *
     4   -565    209   -949   -665    784   -398   -185  -1406   -333   1031   1746   -935   1385   -843  -1105    263   -744   -783  -1025   -867
     -    206    979   -178   -352    -36    372    585   -635    438   -130   -677   -164     41    -73   -335    -54     27    -12   -255    -97
     -     -9  -7914  -8914   -732  -1329  -3653   -120      *      *
     5   -565    209    113   1159   -806   -398   -185   -608   -333    855  -1447   -935    852    361  -1105    303   -744   -783  -1025   -867
     -    206    979   -178   -352    -36    372    585   -635    438   -130   -677   -164     41    -73   -335    -54     27    -12   -255    -97
     -     -9  -7914  -8914   -732  -1329  -3653   -120      *      *
     6   -565    209    850   1279   -806   -398   -185  -1406   -333   -197  -1447   -935   1676    457   -215   -543   -744   -783  -1025   -867
     -    206    979   -178   -352    -36    372    585   -635    438   -130   -677   -164     41    -73   -335    -54     27    -12   -255    -97
     -     -9  -7914  -8914   -732  -1329  -3653   -120      *      *
     7   -565    209   1864   -310   -806   -398   -185    145   -333    273  -1447   -935   1023   -843  -1105    -26   -744   -783   1118   -867
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     -   -379  -7914  -2139   -732  -1329  -1797   -490      *      *
     8   -482    291   -496  -1040   -724   -316   -103    183    257    101   2371   -852    100   1025  -1023   -742     25   -488   1879   -784
     -    206    979   -178   -352    -36    372    585   -635    438   -130   -677   -164     41    -73   -335    -54     27    -12   -255    -97
     -    -12  -7535  -8535   -732  -1329  -3230   -163      *      *
     9   -482    291   -866   1262    200   -316   -103  -1323    591    581  -1364   -852    675   -423  -1023    463   -661   -700   -943   -784
     -    206    979   -178   -352    -36    372    585   -635    438   -130   -677   -164     41    -73   -335    -54     27    -12   -255    -97
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10	-491	282	654	1205	-733	-325	-112	-1333	-260	264	-1374	-862	687	-770	-1032	903	-388	-506	-952	-794
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11	-266	1416	-799	-720	-269	-249	-36	-818	-183	33	-1297	-785	1857	3	-956	971	-594	-633	-876	-717
-	206	979	-178	-352	-36	372	585	-635	438	-130	-677	-164	41	-73	-335	-54	27	-12	-255	-97
-	-223	-7316	-2868	-732	-1329	-3192	-167	*	*											
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-	-17	-7027	-8027	-732	-1329	-1909	-447	*	*											
13	-332	116	-662	-477	-899	-491	-278	-1499	-426	-611	-1540	-134	2129	-936	-1198	1029	-332	365	1047	-960
-	206	979	-178	-352	-36	372	585	-635	438	-130	-677	-164	41	-73	-335	-54	27	-12	-255	-97
-	-9	-7917	-8917	-732	-1329	-2446	-293	*	*											
14	-712	62	1107	941	-254	-545	1339	-1553	55	904	-1594	343	506	-614	-1252	-972	-891	-930	-1172	-1014
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-	-8	-8058	-9058	-732	-1329	-2365	-311	*	*											
15	-283	1673	-1136	-1007	-993	-585	1333	-432	-520	327	-808	-477	1055	1716	-1292	181	-456	-360	41	-1054
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-	-8	-8154	-9154	-732	-1329	-2784	-226	*	*											
16	-751	1900	-1136	-1309	-993	-115	-372	-1593	-280	-226	916	-763	568	-654	-1292	1139	1426	62	-1212	-1054
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-	-8	-8154	-9154	-732	-1329	-2483	-284	*	*											
17	-757	17	198	-114	-635	-590	-377	185	-525	893	1300	-1127	-154	-554	-1297	-443	-936	1419	-1217	-1059
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-	-8	-8158	-9158	-732	-1329	-2693	-242	*	*											
18	-757	17	993	1177	-998	-590	-377	-1598	-525	-253	-1639	-1127	-154	-1035	-1297	759	1527	-975	537	-1059
-	206	979	-178	-352	-36	372	585	-635	438	-130	-677	-164	41	-73	-335	-54	27	-12	-255	-97
-	-8	-8158	-9158	-732	-1329	-2693	-242	*	*											
19	-757	1387	617	-572	-639	-590	-377	-1598	-136	1458	-1639	-1127	1353	711	-1297	-1017	-604	-975	-1217	-1059
-	206	979	-178	-352	-36	372	585	-635	438	-130	-677	-164	41	-73	-335	-54	27	-12	-255	-97
-	-8	-8158	-9158	-732	-1329	-2383	-307	*	*											
20	-295	12	1542	305	-541	-595	-382	-1603	-530	727	-1644	-1132	1946	-1040	-1302	-808	-941	-980	-1222	-1064
-	206	979	-178	-352	-36	372	585	-635	438	-130	-677	-164	41	-73	-335	-54	27	-12	-255	-97
-	-8	-8162	-9162	-732	-1329	-2203	-353	*	*											
21	-96	-10	-861	-1342	-1025	-617	-404	-650	-552	1406	-1666	1610	-219	-1062	-1324	338	371	-1002	-192	-1086
-	206	979	-178	-352	-36	372	585	-635	438	-130	-677	-164	41	-73	-335	-54	27	-12	-255	-97
-	-113	-8217	-3801	-732	-1329	-2461	-289	*	*											
22	-729	45	-82	-428	702	-562	-349	-1570	-312	1240	-1611	-670	203	-1007	-1269	1259	-908	-59	-1189	-1031
-	206	979	-178	-352	-36	372	585	-635	438	-130	-677	-164	41	-73	-335	-54	27	-12	-255	-97
-	-117	-8086	-3753	-732	-1329	-2032	-404	*	*											
23	-734	39	0	-1292	-976	-568	-355	-1575	-502	-350	-1616	-240	1055	1959	-1275	1573	-913	-669	-166	-1037
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-	-8	-8096	-9096	-732	-1329	-2057	-397	*	*											
24	-316	-10	609	2176	-1025	-617	-404	-684	-365	-742	-1666	-1154	239	-1062	139	-480	-277	-1002	1146	-1086
-	206	979	-178	-352	-36	372	585	-635	438	-130	-677	-164	41	-73	-335	-54	27	-12	-255	-97

-	-7	-8217	-9217	-732	-1329	-2461	-289	*	*														
25	-784	-10	447	-589	1682	-617	-404	-1625	-305	363	586	-364	-659	367	-1324	-774	1522	-575	-1244	-1086			
-	206	979	-178	-352	-36	372	585	-635	438	-130	-677	-164	41	-73	-335	-54	27	-12	-255	-97			
-	-7	-8217	-9217	-732	-1329	-2461	-289	*	*														
26	-784	-10	759	-406	1813	-617	-404	-883	-552	66	-1666	-1154	1542	-1062	-1324	-447	-963	76	2001	-1086			
-	206	979	-178	-352	-36	372	585	-635	438	-130	-677	-164	41	-73	-335	-54	27	-12	-255	-97			
-	-7	-8217	-9217	-732	-1329	-2461	-289	*	*														
27	-784	-10	1511	195	-1025	-617	-404	-1625	523	465	-855	-82	-6	-1062	-1324	970	-963	-1	-1244	-1086			
-	206	979	-178	-352	-36	372	585	-635	438	-130	-677	-164	41	-73	-335	-54	27	-12	-255	-97			
-	-427	-8217	-1984	-732	-1329	-2133	-373	*	*														
28	-531	602	1235	1016	112	149	-152	-1373	-300	284	284	179	656	-810	-1072	-791	-711	-750	-992	-834			
-	206	979	-178	-352	-36	372	585	-635	438	-130	-677	-164	41	-73	-335	-54	27	-12	-255	-97			
-	-11	-7634	-8634	-732	-1329	-2202	-353	*	*														
29	-578	195	-963	412	1067	-412	-199	-1419	-346	1377	106	-640	472	-857	-1119	-87	-260	-593	-1039	-881			
-	206	979	-178	-352	-36	372	585	-635	438	-130	-677	-164	41	-73	-335	-54	27	-12	-255	-97			
-	-10	-7759	-8759	-732	-1329	-2560	-268	*	*														
30	-578	195	-963	-77	1357	-412	-199	-1419	-346	-33	293	250	591	-448	-1119	-274	-260	-796	3430	-881			
-	206	979	-178	-352	-36	372	585	-635	438	-130	-677	-164	41	-73	-335	-54	27	-12	-255	-97			
-	-234	-7759	-2783	-732	-1329	-2560	-268	*	*														
31	-291	294	-864	651	740	-313	-100	-1320	1140	-815	-1362	926	-645	-758	-1020	1095	-659	-504	-940	-782			
-	206	979	-178	-352	-36	372	585	-635	438	-130	-677	-164	41	-73	-335	-54	27	-12	-255	-97			
-	-188	-7480	-3104	-732	-1329	-2158	-366	*	*														
32	-444	329	-7	-249	-686	-278	-65	-1286	-213	1031	-62	654	885	-723	-985	-704	-624	695	-905	-747			
-	206	979	-178	-352	-36	372	585	-635	438	-130	-677	-164	41	-73	-335	-54	27	-12	-255	-97			
-	-107	-7370	-3937	-732	-1329	-2730	-236	*	*														
33	-411	362	66	-969	-653	-245	-32	-1252	-179	1425	-1293	1278	-576	-690	-952	-498	-590	308	-872	-713			
-	206	979	-178	-352	-36	372	585	-635	438	-130	-677	-164	41	-73	-335	-54	27	-12	-255	-97			
-	-14	-7242	-8242	-732	-1329	-2013	-411	*	*														
34	-522	251	448	276	154	-356	-143	-1364	-290	-859	-1405	359	1839	-801	-1063	180	-702	674	-983	-825			
-	206	979	-178	-352	-36	372	585	-635	438	-130	-677	-164	41	-73	-335	-54	27	-12	-255	-97			
-	-22	-7595	-6625	-732	-1329	-1691	-535	*	*														
35	-622	151	-503	1105	-864	406	-243	-849	-391	476	-101	-993	1054	-901	-1163	-236	42	-242	1500	-925			
-	206	979	-178	-352	-36	372	585	-635	438	-130	-677	-164	41	-73	-335	-54	27	-12	-255	-97			
-	-96	-7877	-4057	-732	-1329	-2386	-306	*	*														
36	198	188	-690	579	-827	657	-206	-1426	-353	-91	-562	1354	646	-525	-1126	259	-764	-203	-1046	-887			
-	206	979	-178	-352	-36	372	585	-635	438	-130	-677	-164	41	-73	-335	-54	27	-12	-255	-97			
-	-10	-7792	-8792	-732	-1329	-2350	-315	*	*														
37	-455	160	893	-1172	-856	-448	-235	-1455	-382	-368	-1496	1552	1488	-55	-1155	253	-793	25	982	-916			
-	206	979	-178	-352	-36	372	585	-635	438	-130	-677	-164	41	-73	-335	-54	27	-12	-255	-97			
-	-9	-7870	-8870	-732	-1329	-2659	-249	*	*														
38	-614	160	-998	643	-856	-448	-235	-216	-382	848	-740	217	-779	226	-1155	577	-793	685	878	-916			
-	206	979	-178	-352	-36	372	585	-635	438	-130	-677	-164	41	-73	-335	-54	27	-12	-255	-97			
-	-9	-7870	-8870	-732	-1329	-2659	-249	*	*														
39	347	160	754	399	228	-448	-235	-1455	-382	1042	-1496	217	727	-893	-1155	-364	-793	-832	-1074	-916			

-	206	979	-178	-352	-36	372	585	-635	438	-130	-677	-164	41	-73	-335	-54	27	-12	-255	-97				
-	-76	-7870	-4418	-732	-1329	-2659	-249	*	*															
40	470	189	166	-1142	-826	-418	-205	-1425	-352	537	-720	-954	240	-863	-1125	1548	-13	-183	-1045	-887				
-	206	979	-178	-352	-36	372	585	-635	438	-130	-677	-164	41	-73	-335	-54	27	-12	-255	-97				
-	-163	-7783	-3291	-732	-1329	-2182	-359	*	*															
41	-42	246	-354	-424	-769	-361	-148	-924	-295	466	169	-897	743	783	421	656	158	-745	-988	-830				
-	206	979	-178	-352	-36	372	585	-635	438	-130	-677	-164	41	-73	-335	-54	27	-12	-255	-97				
-	-58	-7603	-4877	-732	-1329	-2440	-294	*	*															
42	416	243	-18	499	-772	98	-151	-937	-298	625	-653	-109	-129	-809	313	-595	-480	547	-991	-833				
-	206	979	-178	-352	-36	372	585	-635	438	-130	-677	-164	41	-73	-335	-54	27	-12	-255	-97				
-	-11	-7657	-8657	-732	-1329	-2248	-341	*	*															
43	-605	169	93	334	-846	21	-225	-1446	-373	446	1232	-975	923	241	-1145	692	-784	174	-1065	-907				
-	206	979	-178	-352	-36	372	585	-635	438	-130	-677	-164	41	-73	-335	-54	27	-12	-255	-97				
-	-9	-7863	-8863	-732	-1329	-1877	-458	*	*															
44	-622	521	1100	-1180	-864	880	-243	-1464	-391	-26	-770	-680	799	-488	-1163	757	784	-841	-1083	-925				
-	206	979	-178	-352	-36	372	585	-635	438	-130	-677	-164	41	-73	-335	-54	27	-12	-255	-97				
-	-175	-7877	-3184	-732	-1329	-1750	-509	*	*															
45	1115	217	736	114	-388	-390	903	-1398	-324	-742	-1439	-626	1239	318	-1097	-634	-736	-44	100	-466				
-	206	979	-178	-352	-36	372	585	-635	438	-130	-677	-164	41	-73	-335	-54	27	-12	-255	-97				
-	-11	-7679	-8679	-732	-1329	-1918	-443	*	*															
46	503	1267	571	66	-451	-436	-223	-1443	-370	319	-1484	-972	1436	-881	-1143	3	503	-820	-1063	-905				
-	206	979	-178	-352	-36	372	585	-635	438	-130	-677	-164	41	-73	-335	-54	27	-12	-255	-97				
-	-10	-7804	-8804	-732	-1329	-2221	-348	*	*															
47	276	171	-50	290	-844	-436	-223	-616	-370	-648	2313	-972	537	-881	52	-174	-503	762	-1063	-905				
-	206	979	-178	-352	-36	372	585	-635	438	-130	-677	-164	41	-73	-335	-54	27	-12	-255	-97				
-	-89	-7804	-4177	-732	-1329	-1785	-495	*	*															
48	179	176	1312	293	-839	358	-218	-1100	-365	195	703	-405	860	-552	-1138	-857	-777	41	-1058	-900				
-	206	979	-178	-352	-36	372	585	-635	438	-130	-677	-164	41	-73	-335	-54	27	-12	-255	-97				
-	-74	-7794	-4454	-732	-1329	-1710	-526	*	*															
49	-603	170	1251	431	-845	41	-224	-1444	-371	-199	-1486	618	1188	-561	-1144	204	-783	266	-1064	-906				
-	206	979	-178	-352	-36	372	585	-635	438	-130	-677	-164	41	-73	-335	-54	27	-12	-255	-97				
-	-57	-7807	-4870	-732	-1329	-1790	-492	*	*															
50	67	163	-295	-1169	-852	-444	-231	-1119	-379	981	-1493	-570	1006	196	-384	-870	371	496	1512	-913				
-	206	979	-178	-352	-36	372	585	-635	438	-130	-677	-164	41	-73	-335	-54	27	-12	-255	-97				
-	-42	-7825	-5384	-732	-1329	-2212	-351	*	*															
51	200	175	448	-230	159	-237	-219	-1439	-366	478	1195	-968	730	-877	-1139	-495	519	309	-89	-900				
-	206	979	-178	-352	-36	372	585	-635	438	-130	-677	-164	41	-73	-335	-54	27	-12	-255	-97				
-	-110	-7816	-3852	-732	-1329	-1828	-477	*	*															
52	658	208	433	338	-497	-400	-187	-1407	-334	876	-1448	-936	902	-527	-1107	104	-98	-784	-1027	-868				
-	206	979	-178	-352	-36	372	585	-635	438	-130	-677	-164	41	-73	-335	-54	27	-12	-255	-97				
-	-88	-7703	-4207	-732	-1329	-2026	-406	*	*															
53	917	218	-584	368	-196	-179	-176	294	-324	-892	-1438	-132	795	-834	-1096	730	73	-774	-31	-432				
-	206	979	-178	-352	-36	372	585	-635	438	-130	-677	-164	41	-73	-335	-54	27	-12	-255	-97				
-	-60	-7743	-4798	-732	-1329	-1419	-676	*	*															

54	582	160	86	455	-531	-96	-235	-1455	-382	-457	-1496	-984	2014	-893	-1155	-355	-142	-832	1282	-176
-	206	979	-178	-352	-36	372	585	-635	438	-130	-677	-164	41	-73	-335	-54	27	-12	-255	-97
-	-21	-7870	-6665	-732	-1329	-1630	-563	*	*											
55	751	147	398	821	-868	-460	-247	-1468	-395	-377	-1509	-997	301	1472	-1167	-887	1054	-845	-1087	-929
-	206	979	-178	-352	-36	372	585	-635	438	-130	-677	-164	41	-73	-335	-54	27	-12	-255	-97
-	-107	-7879	-3889	-732	-1329	-1847	-470	*	*											
56	398	184	1349	-390	-831	248	-210	-1430	-357	-925	-1471	-166	1286	-868	-1130	-657	302	-188	2042	-891
-	206	979	-178	-352	-36	372	585	-635	438	-130	-677	-164	41	-73	-335	-54	27	-12	-255	-97
-	-153	-7788	-3377	-732	-1329	-2323	-322	*	*											
57	-532	241	-651	-283	766	-218	205	-548	-301	-579	-1415	-903	1761	-811	-456	-792	-36	1252	-993	-835
-	206	979	-178	-352	-36	372	585	-635	438	-130	-677	-164	41	-73	-335	-54	27	-12	-255	-97
-	-162	-7632	-3303	-732	-1329	-2307	-326	*	*											
58	1034	278	753	710	-737	384	-116	-1337	-264	-832	-87	-866	-209	-774	-1036	-575	693	64	-956	-798
-	206	979	-178	-352	-36	372	585	-635	438	-130	-677	-164	41	-73	-335	-54	27	-12	-255	-97
-	-12	-7533	-8533	-732	-1329	-2717	-238	*	*											
59	579	278	-617	1313	-737	174	-116	-1337	-264	-478	-1378	514	724	369	-1036	-188	-115	-714	-956	-798
-	206	979	-178	-352	-36	372	585	-635	438	-130	-677	-164	41	-73	-335	-54	27	-12	-255	-97
-	-12	-7533	-8533	-732	-1329	-2717	-238	*	*											
60	1098	278	487	-534	211	-133	-116	-1337	-264	-683	-1378	-866	964	-79	-1036	-755	-675	-714	3120	-798
-	206	979	-178	-352	-36	372	585	-635	438	-130	-677	-164	41	-73	-335	-54	27	-12	-255	-97
-	-144	-7533	-3481	-732	-1329	-2717	-238	*	*											
61	725	333	-570	-998	925	-274	-61	-1281	-208	473	-1323	-810	1742	-413	-981	-700	-412	-213	-901	-743
-	206	979	-178	-352	-36	372	585	-635	438	-130	-677	-164	41	-73	-335	-54	27	-12	-255	-97
-	-170	-7371	-3247	-732	-1329	-2845	-216	*	*											
62	406	398	148	-26	-617	776	4	-1216	-143	-711	-1258	-402	1159	-654	367	-635	676	-593	-836	-678
-	206	979	-178	-352	-36	372	585	-635	438	-130	-677	-164	41	-73	-335	-54	27	-12	-255	-97
-	-14	-7329	-8329	-732	-1329	-3371	-147	*	*											
63	647	392	304	748	-623	-215	-2	-1222	-149	-547	1052	-751	1014	-660	-584	-641	110	48	-842	-684
-	206	979	-178	-352	-36	372	585	-635	438	-130	-677	-164	41	-73	-335	-54	27	-12	-255	-97
-	-13	-7333	-8333	-732	-1329	-2319	-323	*	*											
64	680	355	1718	-635	-660	-252	-39	-1259	-186	-754	-567	-788	1015	-697	-576	-176	327	-636	-879	-721
-	206	979	-178	-352	-36	372	585	-635	438	-130	-677	-164	41	-73	-335	-54	27	-12	-255	-97
-	-117	-7358	-3795	-732	-1329	-2132	-374	*	*											
65	350	370	-442	1145	-645	33	-24	-1244	123	-739	-1285	-773	1698	-682	-654	-28	-582	-378	-864	-706
-	206	979	-178	-352	-36	372	585	-635	438	-130	-677	-164	41	-73	-335	-54	27	-12	-255	-97
-	-168	-7258	-3274	-732	-1329	-3043	-187	*	*											
66	1458	1314	-735	-651	-592	1428	29	-1192	-119	-534	-513	-721	-184	-629	-891	-610	-530	-569	-811	-653
-	206	979	-178	-352	-36	372	585	-635	438	-130	-677	-164	41	-73	-335	-54	27	-12	-255	-97
-	-16	-7109	-8109	-732	-1329	-3092	-180	*	*											
67	-205	418	-740	-662	-597	-189	24	-1196	-123	-691	348	-725	2493	-634	-896	-5	-133	-310	-816	-658
-	206	979	-178	-352	-36	372	585	-635	438	-130	-677	-164	41	-73	-335	-54	27	-12	-255	-97
-	-16	-7111	-8111	-732	-1329	-3029	-188	*	*											
68	1061	413	831	-275	-602	-10	19	-1201	-128	-696	-1242	26	-283	-639	592	349	-539	-131	-821	-662
-	206	979	-178	-352	-36	372	585	-635	438	-130	-677	-164	41	-73	-335	-54	27	-12	-255	-97

-	-16	-7114	-8114	-732	-1329	-3270	-158	*	*												
69	505	413	-263	1351	-602	-194	19	-1201	-128	-696	1350	-730	852	-639	-901	-439	161	-578	-821	-662	
-	206	979	-178	-352	-36	372	585	-635	438	-130	-677	-164	41	-73	-335	-54	27	-12	-255	-97	
-	-16	-7114	-8114	-732	-1329	-3270	-158	*	*												
70	1301	413	-72	-670	-602	-50	19	-1201	-128	67	-1242	-730	1414	-639	-901	-620	-253	-37	-821	-662	
-	206	979	-178	-352	-36	372	585	-635	438	-130	-677	-164	41	-73	-335	-54	27	-12	-255	-97	
-	-130	-7114	-3660	-732	-1329	-3270	-158	*	*												
71	750	452	-448	433	-564	-156	57	-1163	-90	238	-1204	-692	1641	-600	-863	-403	-501	-346	-782	-624	
-	206	979	-178	-352	-36	372	585	-635	438	-130	-677	-164	41	-73	-335	-54	27	-12	-255	-97	
-	-44	-6968	-5504	-732	-1329	-3340	-150	*	*												
72	990	461	-697	-870	-554	0	67	-1153	-80	-648	-1195	-682	1105	721	1063	-151	-492	-530	-773	-615	
-	206	979	-178	-352	-36	372	585	-635	438	-130	-677	-164	41	-73	-335	-54	27	-12	-255	-97	
-	-44	-6963	-5483	-732	-1329	-2913	-205	*	*												
73	1181	460	-698	-871	-555	-147	66	-1155	-81	-649	2005	-684	662	-592	-854	-573	-493	753	-774	-616	
-	206	979	-178	-352	-36	372	585	-635	438	-130	-677	-164	41	-73	-335	-54	27	-12	-255	-97	
-	-18	-6945	-7945	-732	-1329	-3397	-144	*	*												
74	418	460	-698	-871	-555	-147	66	-1155	-81	-649	-1196	-684	1980	-592	-854	165	837	-270	-774	-616	
-	206	979	-178	-352	-36	372	585	-635	438	-130	-677	-164	41	-73	-335	-54	27	-12	-255	-97	
-	-18	-6945	-7945	-732	-1329	-3397	-144	*	*												
75	1183	460	-698	1130	-555	-147	66	-1155	-81	-649	-1196	-684	774	-592	387	-573	-493	-531	-774	-616	
-	206	979	-178	-352	-36	372	585	-635	438	-130	-677	-164	41	-73	-335	-54	27	-12	-255	-97	
-	-99	-6945	-4096	-732	-1329	-3397	-144	*	*												
76	902	484	-674	-848	-531	-123	89	-1131	-58	-626	-1172	-660	757	-568	-830	-305	1254	690	-750	-592	
-	206	979	-178	-352	-36	372	585	-635	438	-130	-677	-164	41	-73	-335	-54	27	-12	-255	-97	
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RF no
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INTERNATIONAL SEARCH REPORT

International application No.
PCT/US00/10302

A. CLASSIFICATION OF SUBJECT MATTER
IPC(7) : G01N 31/00; G06F 15/00, 17/00
US CL : 702/27; 706/45, 47; 712/200
According to International Patent Classification (IPC) or to both national classification and IPC

B. FIELDS SEARCHED

Minimum documentation searched (classification system followed by classification symbols)
U.S. : 702/27; 706/45, 47; 712/200

Documentation searched other than minimum documentation to the extent that such documents are included in the fields searched

Electronic data base consulted during the international search (name of data base and, where practicable, search terms used)
Please See Continuation Sheet

C. DOCUMENTS CONSIDERED TO BE RELEVANT

Category *	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
Y	YUAN et al. Towards detection of orthologues in sequence databases. Bioinformatics. 1998, Vol. 14, No. 3, pages 285-289, see entire document.	1-32
Y	BAILEY, JR. et al. Analysis of EST-driven gene annotation in human genomic sequence. Genome Research. 1998, Vol. 8, pages 362-376, see entire document.	1-32
Y	SONNHAMMER et al. Pfam: A comprehensive database of protein domain families based on seed alignments. Proteins: Structure Function and Genetics. 1997, Vol. 28, pages 405-420, see entire document.	1-32

☐ Further documents are listed in the continuation of Box C. ☐ See patent family annex.

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"P" document published prior to the international filing date but later than the priority date claimed

"T" later document published after the international filing date or priority date and not in conflict with the application but cited to understand the principle or theory underlying the invention

"X" document of particular relevance; the claimed invention cannot be considered novel or cannot be considered to involve an inventive step when the document is taken alone

"Y" document of particular relevance; the claimed invention cannot be considered to involve an inventive step when the document is combined with one or more other such documents, such combination being obvious to a person skilled in the art

"&" document member of the same patent family

Date of the actual completion of the international search	Date of mailing of the international search report
05 June 2000 (05.06.2000)	07 JUL 2000
Name and mailing address of the ISA/US Commissioner of Patents and Trademarks Box PCT Washington, D.C. 20231 Facsimile No. (703) 305-3230	Authorized officer Young J. Kim Telephone No. (703) 308-0196

Form PCT/ISA/210 (second sheet) (July 1998)

INTERNATIONAL SEARCH REPORT

International application No.

PCT/US00/10302

Continuation of B. FIELDS SEARCHED Item 3: STN Commercial Database (Biosis, Medline, Embase, Embal, SciSearch, Biotechds, Caplus)
West 2.0 (USPT, EPAB, JPAB, DWPI, TDBD)
Search Terms: gene tree, species tree, Hidden Markov, HMM, overlap, BLAST